

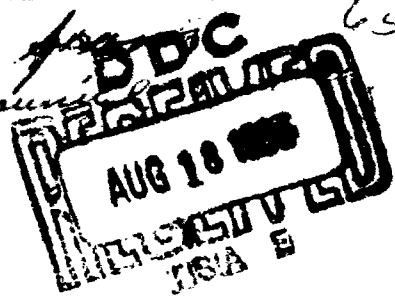
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LABORATORY ANIMALS

V. WORKSHOP IN ANIMAL TECHNICIAN TRAINING

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Publication 1285

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LABORATORY ANIMALS

V. Workshop in Animal Technician Training

**October 2, 1964
Washington, D. C.**

**A Report of the
INSTITUTE OF LABORATORY ANIMAL RESOURCES**

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Washington, D. C.
1965**

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FOREWORD

One of the most challenging and important aspects of the dynamic laboratory-animal field is the training of laboratory animal technicians. It is recognized that animal care is becoming a profession and a discipline, and that the work of the caretaker is one of the most important components in laboratory animal care. The caretaker must have some understanding of the biology of his charges; animal health and disease; sanitation and hygiene; housing and equipment design; administration, management, and recordkeeping; shipping and receiving animals; safety; and animal experimentation.

An excellent start in training of junior and senior animal technicians has been made under the sponsorship of several of the local branches of the Animal Care Panel. The purpose of this two-day workshop, sponsored by the Institute of Laboratory Animal Resources, was to evaluate the progress made in training caretakers, and to formulate a plan for the future. On the first day, three study groups met and discussed the following assignments: Study Group I - Evaluation and amendment of existing curricula for junior and senior technicians; Study Group II - Determination of types of training needed by supervisory technicians, length of courses, and subject matter; Study Group III - Determination and recommendation of training aids available for both Junior-Senior and Supervisory Technician training courses. The second day of the workshop was open to the scientific public; nearly one hundred persons attended. Group leaders presented summaries of discussions and answered questions of participants. Papers were presented by recognized leaders in the field of animal technician training, in the United States and Great Britain.

From the workshop there evolved a new concept of the animal technician, as well as a working blueprint for development and training of animal technicians.

The workshop was under the direction of Mr. Berton F. Hill, Executive Secretary of the Institute of Laboratory Animal Resources at the time.

PROGRAM PARTICIPANTS

Dr. L. R. Christensen (New York University), Chairman

Panel 1 - Dr. Charles M. Vaughn
(State University of South Dakota)
Chairman

Panel 2 - Dr. Howard A. Schneider
(Rockefeller Institute)
Chairman

Panel 3 - Dr. Henry P. Schneider
(Hahnemann Medical College and Hospital of
Pennsylvania)
Chairman

Berton F.Hill (Institute of Laboratory Animal Resources)

SPEAKERS

Mr. Douglas Short - National Institute for Medical
Research, London.

Dr. Norman Hayes - Communicable Disease Center,
Atlanta, Georgia

Mr. Earl M. Bowler - Office of Education, Department of
Health, Education, and Welfare

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Opening Remarks

MR. HILL: I would like to welcome you, that half of you who arrived here so far because of the rain and the traffic problem. We feel we would like to keep on schedule, so we wish to start the morning session.

I think you all know me. I am Bert Hill, the Executive Secretary of the Institute of Laboratory Animal Resources. I asked for permission to say a few words before we started the formal part of the program.

First of all, on behalf of the Academy, I want to thank all of the 25 members of the panels, and particularly the Chairmen, who sat for a long day yesterday preparing reports on subjects which will be discussed today. I wish also to thank Mr. Douglas Short, who will speak today, Dr. Hayes, who will speak today, and Mr. Bowler, from Health, Education, and Welfare, will be a speaker.

I draw your attention to a few things on the program. First of all, we have a two page program. The first page was yesterday's panels, so turn, please, to page 2 so you are not confused.

I direct your attention to the fact that we will have a coffee break at 10:30 this morning in the Great Hall of the Academy, which can be reached by going out the door to your rear, turning right through the lobby, and it is the room right back of the lobby.

Lunch will be from 12 until 1:30. You are free to go where you want, but we have a refectory downstairs, where lunch can be obtained cafeteria style. We have made arrangements for sufficient lunches so that everyone may have one. This is in the far wing of the building in the basement. Any of the guards or the secretaries can direct you if you get lost.

Finally, you will notice that each of the speakers and the Study Group Chairmen are permitted one half hour to present their reports. None of them, I believe, will take this amount of time. The difference in time will be taken up with questions and discussion from the floor.

You already have noticed that this discussion is being taped in its entirety. In order for us to be more effective in making sure that the questions are heard, not only by the audience, but by the tape recording machine, I have a series of pads which I am going to pass out which have on them a place for your name and a place for the question. Please don't wait, if you have a question, until the speaker finishes. Jot down your question as soon as it occurs to you. Please print it, or at least write legibly. As soon as the speaker is finished, I or one of my staff members will be on the floor picking questions up which will be brought here. Dr. Christensen will

read them into the microphone so that everyone hears them, and then the speaker can answer the question. Thank you.

I will turn the meeting over formally to Dr. Christensen.

DR. CHRISTENSEN: It is a pleasure to welcome all of you here. Those who have been concerned with these training programs for a number of years must be gratified to see the interest there is in such programs.

I want to reinforce Bert's thanks to the members of the Panels yesterday. I took the prerogative as Chairman and did no work myself, left all the work to them, and simply walked around to see that people were working. It is very gratifying to see people work so hard and know you don't have to do anything.

I think those of us concerned in the training of animal technicians, and that includes all of us here, not merely the members of the Panels, have a unique opportunity which is given to very few people, because today animal care is becoming a profession, a discipline. In the past it has been sort of a haphazard, catchall kind of activity, but now it is being recognized as a profession, and is being recognized that the people in this profession are professionals, and will need training, guidance, and so on.

So we have a rather unique opportunity. Really at this time what we are doing is defining what the professional people -- and I use professional not in the sense of a graduate degree, but people engaged in a certain line of activity -- we are defining here today in effect what this profession of animal care is. I hope we have done a good job. I think we have done a good job. We are not going to be stuck with what has grown up like Topsy through the years, and then say this is the definition. We have used foresight, judgment, intelligence -- I hope -- and are defining, then a new line of endeavor.

INTRODUCTION AND HISTORY OF ANIMAL TECHNICIAN TRAINING

L. R. Christensen

Those of us concerned with laboratory animals know that the competence of the caretaker is the single most important factor in proper laboratory animal care. If he is capable, experienced, and informed, he can overcome serious deficiencies in physical facilities; if incapable, inexperienced, or ignorant, he can negate the advantages of the best in facilities and animals. He is the direct liaison between the investigator and the experimental subject, and should be capable of meeting his responsibilities as a contributing member of the research team, which, in fact, he is. He is a critically important participant in animal experimentation and can make the difference between failure and success.

The Technical Guidance Committee of the Institute of Laboratory Animal Resources has long held that to qualify for this essential

role, the caretaker must have an understanding of the biology of his charges and the ecological niches they occupy, as well as some understanding of the mechanics and philosophy of research and its objectives. Modern research can no longer tolerate the uneducated, the inept, or the indifferent approach to animal care.

Only in very recent years has the care of laboratory animals been recognized as a discipline in its own right, a discipline deserving of skilled professional supervision and trained workers. In a sense, we here today have a unique opportunity; by defining the kind of training the animal technician is to receive we are in effect defining the discipline of animal care. We can use foresight, judgment, and intelligence in organizing this new line of endeavor and not be forced, at a later date, to attempt patchwork modification of unsound principles and practices grown through the years without direction and embedded in tradition.

Organized training of animal technicians started in Great Britain about 15 years ago. Mr. Douglas Short, one of the initiators and moving spirits behind The Animal Technicians Association of Great Britain and its certifying and training programs, will speak later. I will only acknowledge our great debt to the British experience.

In the United States, three major groups have contributed significantly to technician training. All groups were active simultaneously, sometimes in concert, sometimes independently. These three groups have exchanged information and cooperated so closely that it is impossible to assess the individual contributions of each. These three groups are (1) individual investigators, or groups of investigators, organizing and conducting training courses for technicians in their areas, (2) the Institute of Laboratory Animal Resources, through its Technical Guidance Committee, and (3) the Animal Care Panel (ACP), initially through its education committees and more recently through its local branches.

As far as I am aware, the first course for technicians open to individuals outside their own institutions was conducted at Berg Institute, N.Y.U. Medical Center, in 1957. This was a course designed for supervisory personnel, and consisted of sessions lasting two hours, one night a week for several months. This example has been followed by other individuals and institutions. Shortly after this, the Technical Guidance Committee of the ILAR was appointed to determine needs in the area, personnel to be trained, and to recommend curricula. A short time later the ACP also established education committees. The relation between the ILAR and the ACP in this area foreshadowed by several years the present informal arrangement whereby the ILAR gathers information, investigates needs, sets standards, and makes recommendations, and the ACP undertakes, when it is in agreement with recommendations of the ILAR, to implement them. Today, the local branches of the ACP are the most active forces in carrying on technician training programs, and the recommendations arising from this workshop session will strongly influence the training programs

carried on by these branches and by other interested groups.

One of the original decisions made by the Technical Guidance Committee concerned the individuals to be taught. It was clearly recognized that the animal caretaker, the breeder of laboratory animals, the professional supervisor of animal facilities, and the investigators using animals were all badly in need of training in the care and use of animals. It was decided that the greatest need and greatest progress could be made in the education of the animal technician. As you are probably aware, a professional education committee of the ILAR has lately been formed and is concerning itself with the problems of the professional supervisor. In the light of experience it appears that many of the needs of the commercial producer of laboratory animals can be met by the various programs for the animal technician. Little has been done for the investigator. He needs help badly in several areas, but this must await the future.

Considering the animal technician then, the Technical Guidance Committee made several initial recommendations. First, that the basic philosophy of these training programs should be to provide information on the scientific aspects of laboratory animal care rather than on mechanics. Mechanics, it was felt, could be better taught on the job. A biological background was felt to be essential for a proper understanding of the caretaker's role and duties. The curricula recommended, therefore, were directed toward this end. Secondly, that there are three levels of clearly defined professional competence in the field of laboratory animal care. These are (1) the Junior Technician, operating almost entirely under the direction of others and responsible for the more basic mechanical aspects of animal care; (2) the Senior Technician, an individual of more experience, skill, and knowledge who may supervise Junior Technicians or may be assigned responsibility for a certain segment of activity in the animal house; and (3) the Supervisor (now termed "Registered Animal Technician"), the highest level of competence, and an individual with sufficient experience, skill, and knowledge to administer the day-to-day operations of an animal facility under the policy set down by the professional supervisor, as well as to carry the major burden of training personnel at the two subordinate levels. Third, that these are levels of technical competence and are in no way to be considered job classifications.

Following establishment of these levels of competence and the organization of courses by the local branches, the ACP recognized that some mechanism for uniform evaluation of training programs was necessary. Accordingly, the ACP established the Animal Technicians' Certifying Board, which was to:

- (1) establish levels of competence,
- (2) determine and certify the competence of candidates, and
- (3) aid in establishing training programs to prepare candidates for the certifying examination.

Initially the Certifying Board consisted largely of professional individuals, with some technicians. At present, the Board is made up

almost entirely of Supervisors. The Board has established the three levels of competence, Junior Technician, Senior Technician, and Supervisor, recommended by the Technical Guidance Committee, and examines and certifies personnel at all three levels.

The soundness of the program as it has developed in this country (admittedly based on the British program) is attested to by the fact that a UNESCO-ICLA International Conference on Animal Caretakers Training held in Paris in May, 1962, recommended adopting, practically without change, the recommendations of the Technical Guidance Committee in regard to curricula and course content.

In view of the progress indicated above, the necessity for today's workshop might be questioned. I think our activities today can be justified, however. There are two general procedures that can be followed by groups concerned with organizing a line of endeavor. One is for a committee to outline a plan in all aspects and in detail and then prescribe ways of implementing it. The other procedure is the one followed here; indicating in a general way what should be done and leaving implementing groups free to modify or expand, and, more important, to use a great deal more of their own initiative in developing programs. Following a period of field testing, it becomes desirable to examine progress made and, using this experience, to develop a more specific set of recommendations. Our task then is to review, consolidate, and integrate the experience to date and to develop a set of recommendations and conclusions for workers in the field. We hope that this will aid in establishing unity and coherence in training programs, integration with other programs and the Certifying Board, and aid others to establish and conduct new courses. Our purpose, therefore, is to look at what has been done over the past six or seven years. Is it right or wrong; can it be made better? We must summarize what has been done and, from the vantage point of that summary, consider further recommendations for what appears to be the most practical scheme for educating our animal technicians.

Now, the various study groups will be identified as they come up, I believe. The first study group had the charge of looking into the junior and senior curricula that have been used already. Dr. Charles Vaughn, Program Director, College and Elementary Programs, Institute Section, National Science Foundation, was chairman.

REPORT OF STUDY GROUP I

Charles M. Vaughn

Our deliberations began with the consideration of three basic documents that were made available to all study groups. They were the junior and senior animal technician training courses, and the certification of requirements of the Animal Technician Certifying Board of the Animal Care Panel. Fortunately, our group included individuals who had taught in at least four courses of instruction. Dr. S. M. Michaelson made available curricula from five other courses at the junior and senior levels.

We attempted to separate the junior and senior technician programs as to content, length of time, and generalized comments applicable to both courses. The junior program should be 12 weeks duration, consisting of two-hour periods, or 24 hours total instruction. One individual should be assigned the primary responsibility, including visual aids, but he can use guest lecturers to present any subject or block of instruction. The order and topics should be revised. It should be remembered that these students will be receiving their first exposure to the principles of laboratory animal care. Basic material must be presented.

In the senior programs, the time devoted to instruction was increased to 14 sessions, totaling 28 hours. The responsible individual should be both a lecturer and coordinator to ensure the selection of the best possible guest speakers to present technical subjects to the students. The program of instruction for senior technicians was deemed to be adequate although some minor modifications might be desirable. The time devoted to each subject should be determined by the instructor according to the level of competence of particular groups of students. Usually, instructors tend to become more sophisticated, both in course content and manner of presentation, with accumulation of experience.

The junior animal technician course* should be modified essentially as follows: The introduction should, in addition to items contained in Section 1, include the topic from Section 13 dealing with the role of the animal technician as a member of the research team. The topics of handling, shipping, and receiving animals should be presented following the general introduction. Housing, equipment, and sanitation would logically follow. Subjects on life and biological organization followed by structure and function, nutrition, and metabolism, would then be presented. Breeding, basic genetics, and mating procedures employed would be covered, and followed by the major topics of animal health and common diseases, including the logic of sanitation and sterilization practices. Administration, including management and records, would be followed by topics on safety, experimental design, and finally a critique of the entire course.

It was the conclusion of the study group that the Committee on Technical Guidance and/or the Animal Care Panel should consider the expansion of the content of the two curricula and indicate additional topics that should be included to ensure uniformity wherever the training program is activated.

DR. CHRISTENSEN: Are there any questions on Dr. Vaughn's presentation?

Dr. Albert asks shouldn't laboratory sessions be used in about one half of the senior technician courses?

* See Appendix IV.

We will ask for Dr. Vaughn's comments.

DR. VAUGHN: What is meant by laboratory sessions? We felt that demonstrations and using the course outline as presented in both curricula would involve the actual utilization of material to emphasize and demonstrate factual information that was presented. There was no intent, I think, in our presentation to indicate that the teaching, if best presented with the laboratory experience, would be excluded. We were simply talking about the content of the material, rather than the method, lecture, demonstration or actual participation. For example, it was suggested in the section on experimental design, to use an actual experiment in progress, and go through it as a review mechanism of all the topics covered as to why each of these topics played a role in this particular experiment, tying the technician directly into each step of the operation.

DR. CHRISTENSEN: Are there any more questions or comments? Thank you, Dr. Vaughn.

I do know that they have made great efforts, because I had sat in the session at this point; they made great efforts to show that the committee was really working by avoiding the use of the same item under the same number, which took up a fair amount of their time, but they could not get out of it. They had to use old No. 10 or new No. 10.

The next subject is what has been called in the past the supervisor curriculum, and I believe that group will have some comments on the use of the term. The Chairman of the group is Dr. Howard Schneider, Member of the Rockefeller Institute. Dr. Schneider.

REPORT OF STUDY GROUP II
Howard A. Schneider

Study Group II began, as I think every committee should begin, by inquiring among themselves why they had assembled. The mission of Study Group II had been suggested in the convening outline as a determination of the types of training needed by supervisory technicians, length of course, subject matter, etc. In a preliminary exchange of views, it was found that the word "supervisor" was a kind of semantic trap; that in practice it designated individuals at different levels in administrative procedures in different organizations, in widely varying numbers of personnel assigned under them, and in different degrees of assigned responsibility. It became very fuzzy to attempt to assess what this idealized supervisor might be.

There is a history to this, of course, and the history is revealing. When the notion of technician training arose, it seemed that there were three identifiable levels. These were, in a sense, a priori. There was the neophyte, the beginner, the man first being introduced into animal care, who obviously was assigned the slot of "junior". Then there was another person who had been employed for some time, who had some experience, and of whom more was expected.

It was logical that the term "senior technician" was assigned to him.

This left a third category, identifiable as the man who did some hiring and firing, who assigned people tasks, who complained bitterly about absences, and who in a general way had a supervisory responsibility. When it came right down to it, it turned out that the supervisor became a kind of father figure who had all the attributes, training, sophistication, and depth of all the men who were working under him; and in addition was clean, reverent, thrifty, and hardly distinguishable from a scoutmaster.

The facts of the matter are, of course, that in institutions of whatever kind, commercial or academic, the choice of a person for the supervisory capacity reflects some ill-defined and almost unassayable attributes of personality that make him a logical candidate for the post of dealing with the human problems that arise in any organization. And sometimes the mere advance of years confers, perhaps by a graying of the temples, a kind of air which is successful in intimidating younger people, and seeing that tasks assigned are performed.

It is also true that there are some people who do not relish these tasks, and who would prefer to use their energies in the extension of their own competencies and become specialists in certain areas, and who, in a word, just don't care for administrative responsibilities and duties.

The a priori recognition of a third category at the apex of the pyramid of junior and senior technicians presents a recognizable problem, but upon inspection it is difficult to pinpoint and define.

The first result of the Study Group's examination was a recognition that in a sense we had been painting ourselves into a corner by the historical development of the ideas of junior and senior, and the postulation of the supervisory capacity as a third and identifiable level. The committee decided to attempt a fresh approach.

In thus regrouping, the committee came forward with its first recommendation. It was the recommendation that the Animal Care Panel create a registry, a registry of technicians qualified at this third identifiable level of competency, and that these persons be identified thereafter not as supervisors but as Registered Animal Technicians, and that the Animal Care Panel henceforward maintain such a registry. This is our suggested resolution of the semantic impasse.

The second item that the committee recommends is that we seriously address ourselves to the problem which has been hypothetical until now: as to whether or not a board of examiners, preliminary to issuing such a registration and recognizing a third and apex level of competency, - whether a panel of examiners can actually identify operationally such qualified people.

Therefore, the committee recommended that an examining board be set up with the cooperation and collaboration of the Animal Care

Panel, and the Institute of Laboratory Animal Resources. This examining board should draft sets of examination questions to identify the proposed third level of competency. Useful comparisons may be made with the questions drafted by our British colleagues, which Mr. Short, a member of our Study Group, has kindly consented to provide.

On the assumption, therefore, that a third level of competency is identifiable, the committee then fell to the task of trying to give some substance to a curriculum which would provide a path toward this third level.

It proceeded on the assumption that the definitive way in which such a competency was identifiable was by means of passing the examination. In theory it was conceivable that a person, by virtue of a series of life experiences or self-instruction and study, would arrive at a level of competency where he could pass that examination. But the committee also felt that it should provide a route whereby a person could progress from the junior and senior category into the registered technician category. This demands the usual paraphernalia of curricula, and of course what we had to build on was indeed the then unamended curriculum with which Dr. Vaughn, who preceded me, dealt.

In a general way we made some omissions on the assumption that a man now entering this third level of competency and instruction therein had some degree of experience as ascertainable by his participation in previous courses, and by the length of his experience in ongoing organizations.

We omitted the categories, for instance, of the introduction to animal care and life, and living matter and biological organizations. "Structure and function" was changed to "general anatomy and physiology." We thought that we should still append the notion of elementary genetics and mating systems to that category, keeping in mind that what we were trying to do was equate and sophisticate, but not necessarily instruct in depth, to a degree of advanced professional competency.

We eliminated handling. In the section on animal health and disease, and sanitation and hygiene, there was a little more elaboration. There was a recognition from the British experience of what is obviously going to be an increasing development in animal laboratories, i.e., the development of theories and practices in gnotobiosis; and, as a background for that, we felt that more elementary microbiology and microscopy was needed. In another section we also took cognizance of the fact of the increasing use by investigators of radioactive isotopes and all the problems in safety and disposition and handling of animals that relate to these.

In section No. 10, which escaped any mutilation in the previous committee but was not left unattended in ours, there was now an increasing recognition that in the third level of competency we might expect that personnel would begin to have more of an awareness of certain aspects of what I think we described as the legal framework

in which the animal caretaker moves, and in his relationships, especially his community relationships, with the various societies that have animal care within their purview in one context or another. I suppose that in a general way we hope to prepare an individual at the third level for some ability, if not necessarily a direct responsibility, to respond to such demands or inquiries as the community and the locality in which he finds himself may place upon him.

In a general way, and again without trying to pinpoint the exact number of hours, it seemed to us that the instruction we were dealing with here would involve an over-all investment of about 80 hours.

In conclusion, I see one last significant addition. That was that the registered technician should have a deeper understanding and sophistication in the area of operative techniques and practices. That in the animal operating theater he might move about a little more sure-footedly, with some understanding of the processes that were involved, and be able to play his proper role in preparation of the operating theater.

The final recommendation was to provide contact with some visible means of implementing a program of instruction that would provide that the successful participant had automatically a feeling of having now progressed, that he had actually advanced from the ranks of junior and senior technicians.

We also thought that by striving for an increased sophistication and depth in instruction we needed the participation in a direct way, of some local college in the community. In order to clarify this, we attempted to visualize the situation in New York City, where we witnessed the first program at the junior level. Some of us reflected on the fact that in New York City we had a great many colleges - I am speaking of Greater New York now - and on Long Island in particular in the last decade we have witnessed the rise in response to need of so-called community colleges. These provide night courses, which, at least in their public image, convey some sense of responsiveness to community needs.

We felt that the way to begin and give shape to this program would be the converging of a board of examiners with an actual drafting of a set of typical examination questions, which would clearly identify a third level of competency as compared to the first and second, junior and senior, levels. That with this in hand, and with the benefits that would accrue from what would happen in the interaction of a group of examiners who would finally hopefully settle on such a typical set of questions, we suggest the solicitation now of the cooperation of one of our community colleges in the Greater New York area, with the idea of forming some cooperative arrangement whereby the college gains a unique program - many of these colleges are ready to do this - and in which, in return, a disinterested group would provide some sense of the kind of instruction now being sought, and provide assistance to the college faculty or administration itself in furnishing people who would serve as lecturers or

instructors.

It is fortunate that one of the committee's members, Mr. Short, was the editor with Miss Woodnott, and published in 1963 the first book that could be considered as a textbook in this area. The book, of course, is the Animal Technicians Association Manual of Laboratory Animal Practice and Techniques. It is recent, new, well printed, and has much to recommend it.

Thank you.

DR. CHRISTENSEN: This question is from Sergeant Phillips: Will there be a minimum educational and physical fitness level established for the various persons for whom these courses are being developed?

DR. HOWARD SCHNEIDER: I should think that if the suggestion of the committee is a successful one, and we are able to form a liaison with a college that we will probably have some ground rules set down for us before matriculation at this college can be consummated, and that this may well dominate. Right now the committee had nothing in its mind to set forth any such restrictions. The committee began with one thought, and that was, if we can set forth an examination which identifies the hypothetical third level, then let us go on from there and provide the route by which interested individuals can achieve this. Have I answered your question, Sergeant Phillips?

SERGEANT FREDERICK PHILLIPS: (Andrews Air Force Base). Yes.

DR. HOWARD SCHNEIDER: It looks like the ground rules are going to be laid down to us, depending on the kind of connection if we are successful that we make.

DR. CHRISTENSEN: The second question by Dr. Estep: Animal husbandmen play important roles in laboratory animal care and management of colonies. Should their training be reinforced?

DR. HOWARD SCHNEIDER: If an animal husbandman, and I would assume -- am I correct, Dr. Estep, that you are saying a graduate of animal husbandry in some college?

DR. ROGER ESTEP: (Howard University). That is right.

DR. HOWARD SCHNEIDER: The committee has in an informal way -- some of its members have seen such curricula, and have privately expressed the opinion that a graduate of such a course might well be armed to do very well in such examinations, and the thing that would limit him in the kind of slot in which he would find himself would be years of experience which, after all, have to take place in the transition from college into an actual animal facility. But he would move very fast. I don't think that anything but this individual's ambition should be the guide as to whether or not he participates in a course such as we were describing, or just waits for the years to

pass for him to accumulate the given years of experience. My hunch is that all of us recognize the fact that we continually have to re-tool and that what was learned five years past is now two thirds of it out of date.

So that I should think your individual that you have brought to mind would participate, but would have a head start, certainly.

DR. CHRISTENSEN: I have one question. I know that in many of the considerations given to this particular individual, the possibility has been envisioned, and I think Dr. Schneider indicated, that he might at some time undertake management responsibilities, or have them assigned to him, and I know there was some discussion in the committee, but I didn't stay for all of that, about whether this individual should have any training in such things as might be categorized as personnel management, cost accounting, and this kind of thing.

DR. HOWARD SCHNEIDER: Oh, yes. If I did not spell that out in detail, the matters of cost accounting, the ability to keep some sort of a sense and be able to report to higher echelons of administration where the money is going, and what was being obtained for it, was part of the parcel that we had labeled under administration. There were more subtle things, however, in abilities of personality, leadership, and so on, that the committee in its infinite wisdom said can never be taught.

DR. CHRISTENSEN: Are there any other questions?

This is from Mr. Edgar L. Gentles (Downstate Medical Center): The various study groups it seems considered the objectives of the Animal Care Panel and ILAR. What are the incentives at the three levels to encourage participation by technicians?

DR. HOWARD SCHNEIDER: Of course, this is all designed to encourage the participation of technicians, even at the beginner, the neophyte level, and that the route is visible at least that he has a path to tread. If he elects to do so, and invests those evening hours and takes those examinations, he does move on up this ladder. What we are hopeful is that there is another inbuilt feature over which we really have no direct control, and that is as it becomes clearly established that there are these categories, that there are these certifications, that the whole economic climate in which this whole enterprise is operating will be raised. It is the automatic inbuilt feature of a rising improving economic climate that we think will bring added advantage. But nothing succeeds like success. Get it off the ground. Let that first institution recognize that the certificate holder is entitled to some sort of recognition in his salary level, and then it spreads. But this is the way; I guess to start is to begin.

DR. CHRISTENSEN: I gather there are no more questions. There is one comment, from Dr. Albert, who indicates that the Madison Chapter of the Animal Care Panel is getting the University of Wisconsin

Extension Division to undertake their animal technician training program.

At this time, since we have a few minutes until the coffee break I wonder if Mr. Short would like to make any comments. This is in regard to what effect your program has had on salaries of technicians and so on.

MR. SHORT: Our training program in the United Kingdom, of course, has had an effect on animal technicians' salaries by the very nature of the courses and qualifications which these boys and girls have to get. The employing bodies demand this. The reason is probably that we have other technical associations from the laboratory technicians' point of view. These people demand high standards of laboratory technician work, and therefore they can also demand what in our country is a fair wage, and it is rapidly rising. So to compete with these, if we go to the employer and say that we want the animal technicians to have this certain grade of pay, he will look at the qualifications of the laboratory technician and say, "What can you produce such as this?" This is what the laboratory technician has to do. He has to do so many years, and put in so many hours, and pass certain qualifications. So we have got to try to match this to some extent if we are going to lift the whole of the status for the animal technician into the grade in which I have always thought it should be.

So it has been a long hard fight for us to get the employing bodies to recognize that the animal technician plays an important part in medical or biological research. But at last I think we have broken through the ice, and now these people are recognized.

This is astounding to me, and always has been. Here we have the basic material in which the scientist has to work, and yet in the past it has been given to the lowest grade of worker.

So those people engaged in this field, I think, in the future are going to be recognized. They are recognized in our country now, and I hope they are going to be recognized all over the world, because there seems to be an awareness of this. Why it has taken so long, I cannot say. But I am delighted to have the opportunity to come here and talk with the committees, and so forth, the people I have met on this particular subject, on which I have spent a lot of my lifetime. And looking around then at the people here, the eminent people who are here and who are interested in this subject, I think that the American animal technician should think himself a lucky fellow, because when we started forming classes, and things like that, we did not have the advantage of these people who can put pressure and influence to bear on all kinds of things, such as technical colleges, classes in work time, and things like this. We had to start from my level, the technician level, and try to get all of these things organized. And if the talk I have heard the last couple of days is any criterion, I would think this is going to be very successful. I sincerely hope it is.

There is one other thing, Mr. Chairman, I would like to say about money, and that is, this afternoon when I talk about rewards that the people get for the qualifications, I would like you to bear in mind that the average wage in England of a working man is \$50. I think the average wage in America is \$100. So when you see these rewards, don't sniff at them, because in our country they may be a totally different affair than they are in this country.

DR. CHRISTENSEN: I would like to reinforce what Mr. Short has said. Several years ago I went to England and spent several weeks there looking into the care of laboratory animals situation, and particularly into this technician certification system they have. To summarize it very briefly, at the time I was there, the laboratory technicians and the animal technicians were on a par practically, as far as wages were concerned, but more important, to me at least, was the fact that as far as status and prestige go, entirely aside from money, they were also on a par. A thing that was happening here, I don't know how frequently it happened, but I talked to several people who had been there, the thing that was happening there was that some of the people trained as laboratory technicians, which in this country, of course, is a higher rank, had voluntarily gone to the animal technician branch, because they wanted to work with animals, because they suffered no significant loss of pay, besides prestige.

In this country, of course, up until very recently, and not completely yet, the situation is entirely different. The laboratory technician is a higher type person, who takes more pride in his work, and has more prestige and status than the animal technician. But England demonstrates that they can be raised in all of these areas, and believe me, pride and prestige, and so on, associated with a job is as important as the money. It can be done.

If there are no other comments, I think it is time for our coffee break. We will reconvene at eleven.

(Brief recess.)

DR. CHRISTENSEN: Well, I hope you have all had a cup of coffee to keep you awake, and have taken care of your other needs.

The next report will be by Study Group III Chairman, Dr. Henry P. Schneider. Dr. Henry Schneider is Director of the Biological Laboratory of the Hahnemann Medical College.

I may say before he starts that he in some ways had the hardest job of all, because his group was concerned with the problem of teaching aids for these courses, and his committee went into this problem with no knowledge of what the other committees would do, whether what he came up with would fit within the notions of the other people and what they would come up with. So as I say, in some ways he had a harder job than the rest of them. Dr. Schneider.

REPORT OF STUDY GROUP III

Dr. Henry P. Schneider

Study Group III was charged with the following duties:

Determination and recommendation of training aids available for both Junior/Senior and Supervisory Technician training courses (films, filmstrips, mounts, skeletons, laboratory demonstrations, etc.).

Keying of specific training aids to specific subjects.

The training aids as listed above are audiovisual aids and, as such, are materials that do not depend primarily upon reading to convey their meaning. The use of audiovisual aids is based on the principle that all teaching can be greatly improved by the use of such materials in helping to make the learning experience memorable.

Audiovisual aids consist of:

- (1) On-the-job training
- (2) Demonstrations
- (3) Contrived experiences, i.e., the functioning of an animal housing facility, using a model of such a facility
- (4) Exhibits - ready-made and homemade
- (5) Dramatized experiences, i.e., simulated personnel - supervisory relationships
- (6) Tours of animal facilities
- (7) Motion pictures
- (8) Slides, phonograph records, audiotape recordings
- (9) Closed circuit television, videotape recordings
- (10) Visual symbols, i.e., blackboard, felt board, maps, diagrams, charts, blow-ups
- (11) Verbal symbols, i.e., designations that bear no resemblance to the ideas or objects for which they stand. For instance, the word NEWS relates none of the information particular to its meaning and MAN does not look like a man, sound like a man, or feel like a man.

Group III discussed course material in general. They also discussed methodology and trainee qualifications which they surmised were functions of Groups I and II. However, the feeling was that if the choice of visual aids were to be properly correlated with the course outline, a general discussion was necessary so that the duties of Study Group III could be properly defined. The results of the discussion are reflected in the keying of the films, filmstrips, and other audiovisual aids.

The films coded by Study Group III were "Films and Film Strips

Related to Animal Care," prepared by the Visual Aids Committee of the Animal Care Panel, Norman Bleicher, chairman, George Collins, and James Fendrick, published in the Proceedings of the Animal Care Panel, Vol. 11, No.3, pp 138-147, June, 1961.

The films and filmstrips were listed and numbered 1-80.

Page 138 contained film titles	1 - 8
139	9 - 16
140	16 - 24B
141	25 - 32
142	33 - 41
143	42 - 49
144	50 - 57
145	58 - 66
146	67 - 76
147	77 - 80

A supplementary list, numbered 81 to 103 and supplied by Norman Bleicher, completes the films keyed by Study Group III.

The films are keyed to the "Junior/Senior Animal Technician Training Course Outline" and are coded so that the level at which training emphasis is placed is shown. At the same time they are keyed to the outlined subject matter. In addition, + signifies "useful" and ++ signifies "excellent." For example, 71 J++,7C4 and 8C signifies that the film #71 on page 146 of the Proceedings of the Animal Care Panel, Vol. 11, No.3, June, 1961, titled "Biology of Domestic Flies" is excellent for Junior Animal Technician training and, by referring to the course outline, one learns that it recommends 7C4 be used in teaching "Prevention and Control of Infectious Disease" as part of "Animal Health and Disease," and "Pest Control (8C) as a part of "Sanitation and Hygiene."

It must be borne in mind that "Not Recommended" refers only to the undesirability of the use of a particular film as an aid in training various levels of Animal Technicians or Supervisors.

It is unfortunate that many films have not been reviewed by any members of Study Group III. The present Visual Aids Committee will welcome comments of persons having seen any films that have been classified as "Not Reviewed "

The subject matter of the films marked "Specialized" is certain to be important to some individuals, but they are so specific or advanced in context that they do not lend themselves readily to general animal technician instruction.

The Public Health Service, Audiovisual Facility, Communicable Disease Center, Atlanta 22, Georgia, has several catalogues of films dealing with medicine and allied sciences, the majority of which are highly technical and specialized but do contain references to films that lend themselves to animal technician training programs. Course directors can avail themselves of film lists from this source:

- (1) Film Catalogue, 1963
- (2) Cancer Film Guide, 1963
- (3) Film Reference Guide for Medical and Allied Sciences, 1964

These films have not been coded by Study Group III.

- | | |
|-------------------|----------------------------|
| 1. S++, J+, 3B | 46. N.R. |
| 2. J++, 3B | 47. N.R. |
| 3. J++, 3B | 48. -- |
| 4. -- | 49. N.R. |
| 5. S++, J+, 3C | 50. J++, 4A |
| 6. -- | 51. J++, 13A |
| 7. S+, 3C | 52. J+, 12C2 |
| 8. N.R. | 53. C+, 14C2 |
| 9. N.R. | 54. J+, S+, 8A and 12C2 |
| 10. N.R. | 55. S+, C+, 12C2 |
| 11. N.R. | 56. -- |
| 12. S++, 5A | 57. N.R. |
| 13. J++, 3F | 58. N.R. |
| 14. S++, 3F, C++ | 59. N.R. |
| 15. S+, 3B | 60. S++, 5A1; C++, 14C-5 |
| 16. N.R. | 61. N.R. |
| 17. Specialized | 62. N.R. |
| 18. Specialized | 63. N.R. |
| 19. Specialized | 64. N.R. |
| 20. Specialized | 65. N.R. |
| 21. S++, 4C | 66. N.R. |
| 22. S+, 2C | 67. N.R. |
| 23. -- | 68. N.R. |
| 24A. J+, 8C | 69. J++, 8C |
| 24B. -- | 70. N.R. |
| 25. J++, 1F | 71. J++, 7C4 and 8C |
| 26. J++, 1F | 72. -- |
| 27. J+, 1 | 73. -- |
| 28. J+, 6A | 74. -- |
| 29. J+, 6C | 75. J+, S+, 8C and 8D |
| 30. S+, 7D | 76. J++, 8C and 8D |
| 31. S++, 7D | 77. -- |
| 32. N.R. | 78. J++, 1A |
| 33. N.R. | 79. J++, 1A |
| 34. N.R. | 80. J++, 1A |
| 35. Not Available | 81. N.R. |
| 36. N.R. | 82. J+, S+, 7C |
| 37. -- | 83. N.R. |
| 38. J+, 1 | 84. N.R. |
| 39. -- | 85. N.R. |
| 40. N.R. | 86. Specialized |
| 41. -- | 87. C+, 14C2 and 14C7 |
| 42. J++, 7C and 8 | 88. N.R. |
| 43. J++, S++, 7C1 | 89. J++, S++, 1 |
| 44. J++, S++, 7C4 | 90. Specialized C++, C14-2 |
| 45. N.R. | 91. S+, 7D; C+ C14-6 |

- | | |
|-----------------------------|-------------------|
| 92. St, 7D | 98. J+, S++, 6E |
| 93. Specialized | 99. Specialized |
| 94. N.R. | 100. N.R. |
| 95. N.R. | 101. J++, S++, 4A |
| 96. Specialized, C++, C14-2 | 102. C+, C14-1 |
| 97. Specialized | 103. N.R. |

(--) = Not Recommended

(N.R.) = Not Reviewed

Dr. Jules S. Cass, a member of Study Group III, wishes to solicit your aid in an effort to obtain 8 mm or 16 mm films of filmstrips and sets of slides of 2" x 2", 3 1/4" x 4", or 35 mm having to do with laboratory animal husbandry or technology. Copies will be made and the originals will be returned to the sender. The cost of mailing material to be duplicated will be borne by the Veterans Administration. The copies will be available for instruction purposes and the Veterans Administration will identify the source of the original film or slide sets. Wherever possible, it would be appreciated if the films to be reproduced are sent before they have been used for projection so that the best possible copy may be obtained.

Slide sets or films without a sound track must be accompanied by a typewritten list of titles and commentary.

Establishing a repository of educational films pertaining to laboratory animal husbandry and technology can do much to eliminate the shortage of these visual aids that is certain to occur if several branches of the Animal Care Panel should simultaneously initiate training courses.

Information as to the location of other types of visual aids, such as models, charts, diagrams, etc., that may be obtained on a loan basis for instruction purposes will also be accumulated and filed. This information will be furnished to persons seeking audiovisual materials. It must be noted that the Veterans Administration does not wish to acquire visual aids. The Veterans Administration is only interested in putting persons in contact with others who possess particular aids and are willing to loan them.

Any one wishing further information may contact

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 Chief, Research in Laboratory Animal
 Medicine and Care
 Research Services, DMS
 Veterans Administration
 Washington, D. C. 20420

Other visual aids were aligned with specific subject material as listed in the "Junior/Senior Animal Technician Training Course

Outline." (See Appendix IV)

The following is a partial list of suggested visual aids keyed to the Course Outline:

- 1.H Models, Diagrams, Charts, Handouts
- 2.B Microscopic Demonstrations, Models, 35 mm Slides
- 4.A2 Models of Cell Division
- 4.A3 Charts or Diagrams
- 4.B Charts
- 4.B2 Charts, Diagrams, Enlargements of Actual Records, Slides
- 5.A Charts, Diagrams, Slides, Models
- 5.B Slides, Diagrams
- 6.A Living Specimens, On-the-Job Training
- 6.D Demonstrations
- 6.E Living Subjects, Chemical Agents, Equipment
- 7. Microscopic Demonstrations, Models, Slides, Demonstrations
- 7.D Models, On-the-Job Training
- 8. Demonstrations
- 9. Cages, Field Trips, Cage Catalogues, Pictures, Models
- 9.C2 Samples of Materials
- 9.C4 Slides, Diagrams, Blueprints
- 10. Charts, Diagrams, Dramatized Experiences
- 10.D Large Flip Cards
- 11.B Examples, Models
- 12.A Demonstrations
- 12.B1 Equipment, Safety Devices
- 12.B2 Equipment, Safety Devices
- 12.C1 Films, Counters, Scintillators, Badges
- 13. Dramatized Experiences, Charts, and Models.

Study Group III feels that on-the-job training serves in the same way as laboratory sessions, that providing such direct experiences should be the obligation of supervisory personnel within the trainee's organization, and that flexibility should be allowed the course directors and instructors in classroom organization so that "seeing and doing" programs can be incorporated into them.

Study Group III makes the following recommendations to the Committee on Technical Guidance.

(1) The Animal Care Panel Committee on Visual Aids should be commended for its work, and Study Group III recommends that the work be continued and suggests that the Visual Aids Committee collaborate with the Public Health Service Audiovisual Facility, Communicable Disease Center, Atlanta, Georgia 30322.

(2) The list of films and filmstrips should be enlarged, and methods of producing new films should be

investigated.

(3) The Veterans Administration is engaged in developing a central information exchange on teaching aids pertaining to laboratory animal husbandry and technology, including geographical location of slides, diagrams, models, charts, exhibits, etc. The Veterans Administration should be given assistance in the form of pertinent information as to the locations of audiovisual material.

(4) Means should be explored by which televised programs pertaining to laboratory animal husbandry and technology can be stored for use in future instruction; sources for funding such projects should be investigated.

Thank you.

DR. CHRISTENSEN: You stayed well under your 20 minutes. Are there questions?

DR. MARK H. FRIEDMAN (Sloan-Kettering Institute): Is there any recommendation by the committee to keep a library of these films available to courses that are presented?

DR. HENRY SCHNEIDER: I thought that we recognized this when we said there will be a central information center set up, and that this would be done, that there will be films, particularly master films, and unused slides, before they are scratched, would be submitted to the Veterans Administration. They are willing to assume this duty, and they have such an organization planned. This will be a place from which films and slides may be obtained. Other materials they will have according to geographical locations and sources from which you can obtain them. The material to be obtained will be listed.

I felt that this was extraneous, and would not be brought up here, and would be contained in the report to the Committee on Visual Aids. I would be glad to answer any other questions that need clarification.

DR. CHRISTENSEN: From Dr. Gene Bingham (Ft. Detrick, Md.): Why video film? Can it do something that 16 millimeter film cannot, and what is the cost?

DR. HENRY SCHNEIDER: This is an unexplored field as far as this type of program is concerned. However, to answer your last question first, six hours of video tape can be recorded for \$365, and if it is unusable or you wish to edit it, you can wipe it clean and reuse it. It is a tool that needs exploration. As you know, filming, it has been suggested that more films of the home type be made by the people here in their own establishments as long as they are documentary, and they are done with a bit of care. Eight millimeter film, we feel, will produce a good record, and would be very

cheap to produce. We feel that most probably short 15 minute films could be produced for \$25 to \$30. Sixteen millimeter film, as you well know, if it is professionally done, the cost is forbidding.

So it is unfortunate that so many of our procedures that we see on television at our national meetings, where people travel a great distance to give them, that this is not stored information that we can recover. Some memory of this should be set up so that the organizations, the institutions, the animal care branches can have this as a teaching tool, and something to use in their local meetings.

DR. CHRISTENSEN: This question, I think, might properly be answered by Mr. Hill. It is from Dr. Francis H. Bird (University of Maine), who asks: Will the recommendations to the Technical Committee be incorporated in the proceedings of this conference? Would you like to say a word about this?

MR. HILL: Dr. Bird, what technical committee? Do you mean the three study groups?

DR. BIRD: He mentioned several recommendations would be made to the Technical Committee.

MR. HILL: We have not chosen our medium for publication of this conference yet, for a variety of reasons. We have, as some of you know, the Institute of Laboratory Animal Resources which has an informal agreement with the Animal Care Panel that wherever possible we will publish the results of our conferences and workshops and so forth in the Journal of Laboratory Animal Care, the official organ of the Animal Care Panel. The trouble is that it requires money to do this. These usually come out as supplementary issues, supplementary to one of the six existing issues during the year. We did this twice last year, and our total bill was something like \$7500 or \$8700 for two issues. Now, if we can find the money, then we may do this.

Another problem is that we had a conference similar to this on March 29 and 30 of this year on professional education in the laboratory animal sciences, which conference is not yet published. There will be another conference on professional education at the meeting of the Land Grant College Association here in Washington in November. We are hoping we can gather all of these conference materials on education and publish them as a volume. I think they would be much more valuable than if they were separate. So we hope that we will be able to publish this either separately under the Academy's primateur -- That is one of Howard Schneider's words that I picked up last week -- or as we hope, as part of the Laboratory Animal Care Journal. We will include all of the recommendations of the committees yesterday, a fuller report from the study groups than we have been able to incorporate in this morning's session, plus the papers you will hear this afternoon.

DR. CHRISTENSEN: Are there any other comments or questions

on Dr. Schneider's remarks?

Are there any comments in general on the three reports?

Is Dr. Cass in the room? I believe he is not.

Bert, do you know if there is anybody here who knows about the program of visual aids that they are developing? I thought it would be interesting to hear from him about his program, but apparently he is not here.

I would like to ask Mr. Short to comment briefly on your use of training aids, what you have used, and how valuable you have found them, unless again you are going to do this this afternoon, in which case you could do it then.

MR. SHORT: Mr. Chairman, I don't think we are anything like as advanced in teaching aids as you are. I think this is because we are a rather poor country. We seem to employ for training technicians some teaching aids, but not to the extent Dr. Schneider was mentioning just now. We rely on demonstrations for the junior people, at least, lecture demonstrations, jobs done by competent people in a lecture room, so that everybody can gather around and look at them.

DR. CHRISTENSEN: Do you feel that they are a valuable adjunct?

MR. SHORT: Oh, I think so, yes. The younger people get fed up with somebody standing up and just blabbing at them for an hour or so, and if you can intersperse this kind of thing it would be good. But I don't think you should overwhelm people that this is an easy way. For our part our people are not used to teaching themselves, and we think that we ought to try and teach them to do this.

DR. CHRISTENSEN: Thank you. Are there any comments? Would you identify yourself, please?

MR. McMILLION: I am George McMillion, of Hynson, Westcott and Dunning, Baltimore.

I had a general comment that I would like to make, and the comment in itself is a question. People who are considered animal technicians have a formal education from practically nil to a college degree. Several people are employed because of their formal training. They are employed in a specific job so designated at the beginning as a junior, a senior, or a supervisory capacity.

Now, the person's ability to achieve promotions, and so forth, is sometimes regulated by his formal training. Did the committees consider these factors in their work as far as the animal technician training program is concerned?

DR. CHRISTENSEN: This is a question that cannot be answered briefly. I will try it.

In the first place, it has been very clearly in the minds of the committee, and I think in the minds of the committees which acted yesterday, that what we are talking about when we use these terms, junior and senior technician, and supervisor, or now registered technician, we are talking about levels of professional competence, and these terms should be divorced completely and entirely from any kind of table of organization connotations. They are words that define levels of professional competence. We had no better words. We are sorry that they have the connotation of tables of organization. But they are not job classifications. They are levels of professional competence.

So whatever an institution may decide to call such a man, this is of no concern to us, nor does the certifying board's designation of an individual, for example, as a senior technician, mean that this man fits a slot in a table of organization in a pharmaceutical company as a senior technician. This is our own esoteric language of definition of professional competence, and this is one of the most troublesome areas in discussing this whole program that we have had, the question of semantics. I think quite properly Dr. Schneider's committee directed themselves to this problem with a proper term to substitute for supervisor, because even those of us who have been thinking of this for years, and know what we are talking about, continue to get led down bypaths because the term "supervisor" always has the connotation of some kind of administrative responsibility, which is not what we meant. I am glad to see that they did come up with another term, which may not be the one adopted, but at least it gets us out of that bind.

Now, in regard to levels of academic advancement, we are today in a transition stage in a great many other disciplines. It has been organized, people have understood what they want, they have set up training programs, they have set standards for education and competence, and so on. Historically, these are operating and have been operating for some time. As I indicated in the very beginning, we are at this point defining what we mean by these people.

We have a two-fold problem. We have the problem of the people who now are working as animal caretakers with incomplete, inadequate training. These people must be trained to meet the standards that we feel are necessary in today's age.

We have the second problem. It is a growing field. It is a specialty field. This is a field which in the future will require recruitment of people, and the kind of people we would like to see will only be recruited if there is an opportunity for advancement, academic advancement, professional advancement, which is one of the things which the committees today have tried to do.

But we are in a transition period. We have to answer both of those needs today. In the future, ten years, perhaps, I think that we will see further development. The charge to the committees yesterday was to consider this as an interim period, to work out

mechanisms to consider this from the standpoint of perhaps a ten year period, to effect the transition to the time when personally, at least, I hope that the junior technician is, in all cases, at least a high school graduate, or with equivalent training; and that the senior technician is a man with a training and knowledge equivalent to, let us say, a graduate of a two year college. Now, whether he takes this training in two year college program or whether it is provided by some other mechanism, no one knows the answer yet. The top man, the registered technician, I would hope to see in the future that that man has the equivalent of a bachelor of science degree, which might again be obtained in a regular college course in one of the professional schools, or might be obtained in some other way.

Is that an answer to your question?

Are there any other comments or questions?

We have a little time left, and I would like to ask people who have for one reason or another had experience with training programs to give us a short comment on what they think of this picture that we have now presented. Let me call first on Dr. Estep of Howard University. Would you come to the front, please?

DR. ESTEP: I am unprepared, of course. So far I have been impressed with the presentations this morning. I think actually, looking at this as an interim program, it is where we need to go. Of course, a few years ago we had no program training of any type to attract a meeting of this type to evaluate and predict where we are going in the future.

I think the thing that is on my mind most of all, though, and because I am with the University I am impressed with the role the university can play in this, so I would like to take the liberty of expressing my thoughts as to where I think medical centers, especially, how they can participate in such programs in the future.

Therefore, I believe that the thing we need most of all which we have not covered, I think, in any detail this morning is to think about the training that the old supervisor would receive. However, thinking that the supervisor no longer would be an old person, but a young person who has just finished undergraduate college, because of the expanded role of medical research in the many institutions, or the recognition by many institutions that they now need competent people, I feel as if there is a growing need for people who have B.S. degrees in animal husbandry, poultry husbandry, or biology, who will come into these centers, and who in fact will be the people who will run the organizations from day to day, below the professional level, below the level of the veterinarian or the other professional directors of the institution.

How does this fellow make the transition from his training in animal husbandry, per se, to understanding and knowing the peculiarities, the idiosyncracies of the laboratory rat or mouse, or the

guinea pig or rabbit, which he did not touch at all in his four years of undergraduate training?

I feel as if the university probably has a role, a special role that it can play in training such people. Whether or not this should be a degree program, I am not sure. I don't think this is really important. But I do feel that in medical centers, especially, that the animal husbandman could come in and spend a year post-gradually, learning how to operate and to manage a facility, learning certain techniques, working in surgery if necessary, and in radioactive labs if necessary, but best of all, learning the specific peculiarities that are required in management of laboratory facilities. In laboratory facilities, they need to be run efficiently. There is a matter of economics in here. Who is going to balance the budget? Who is going to determine what it really costs per day per dog? Must the veterinarian spend his time doing this? He has not had in depth training in economics. Do you hire an accountant? This certainly increases the cost per dog if you do. So who is going to do these various things?

It seems to me the people with the broad training in animal husbandry, because they have had a smattering of economics in undergraduate college, they can fill these gaps very well.

Now, let me point out that it does not seem as if there need to be very many institutions in the country that will do this. At best, I suppose if every medical center in the country had today a trained supervisor, using it in the old connotation, if there were a trained person, I doubt if there are more than 14 or 15 hundred such institutions in the country. So not in every city in America should there be such programs, but certainly I think there should be one in the East, one in the West, one in the North, and one in the South, where during a period of time we could turn out half a dozen to twenty such people a year, anticipating retirement, and whatever the needs happen to be.

Then I think the other thing we need to do is to turn and see whether or not the U. S. Office of Education is interested in sponsoring such programs. How does a person stay in school? What type of stipend can we afford to pay such a person? I think if we think along these terms, in addition to what we have thought about today for the junior technician and the senior technician, as well as the registered technician, then I think, Dr. Christensen, in that ten year span we are moving as a cohesive unit.

There is one other brief thing I would like to mention. Here in Washington currently there are such organizations as Washington Action for Youth. These organizations are interested in training people that have no training at all. These are people without skills who come in, as many caretakers have come in in the past, but this is a Labor Department program which is authorized under the Manpower Training Act of 1962, and I would like to tell you briefly what is going on here on a very limited scale.

Using our own institution, for example, we are taking on one person, just simply one person without any skills at all, and for 30 weeks we will give this person on-the-job training as an animal technician. We hope at the end of this time he will go out and find a job, and the faculty intends to help him find a job in private industry, working as an animal technician or animal caretaker.

This program is funded to some extent. Here at the Washington Action for Youth they pay the employer \$30 a week up to 30 weeks for training the person. What you have to agree to do is to pay the minimum of \$1.25 per hour wage, actually. So we think this is a good way to train some people who have no skills, who have to go to work, who cannot necessarily compete, or who would not even be selected for these jobs, but who have the potential, but have other difficulties and have sort of been misplaced in society. We think this has the added advantage of giving a person a chance to become a taxpayer rather than a burden on the welfare program. So we are quite enthusiastic about this, and even though it is starting locally, and I know of no intent that anything like this is going to operate nationally, once we have proven its success here in Washington, it may very well have national implications.

I think that is all I could add.

DR. CHRISTENSEN: I would just make one comment about Dr. Estep's remarks, which bears on his latter remarks. This bit of knowledge I owe to Mr. Alfred Havemeier (Berg Institute), who pounded it into my head. Training the unskilled is fine, but I was taught this by Mr. Havemeier, and everything I have seen since has reinforced this knowledge, the essential thing in good animal caretakers, essential above all others, is that the man must like to work with animals, and no matter what else you do with him, if he does not have this basic like, he will not be a good animal caretaker. He may not be able, and I can recall one specific instance, to absorb any kind of education or training in the sense that we are talking about at all, and still be a wonderful man with animals. So as I say, this is perhaps, and perhaps not, a minor point of dispute with Dr. Estep, but these people must like animals, and we have not said this before, but it deserves to be said.

Howie, some of Dr. Estep's remarks about the possible development of this bear on your committee's activities, I think. Do you have any comment you would like to make about his remarks?

DR. HOWARD SCHNEIDER: Dr. Estep said that he was interested, and commented briefly on the role of the university, and it was, I think in a sensitivity to that, that the committee of Study Group IV had decided that the best way in which to identify and also invigorate the course of instruction leading to the third level was by participating with a college. There is another part on which we can expect that some of this interest can filter down, and that is something that we have not touched upon at all, that in the collegiate training in the field of animal husbandry, there is a growing aware-

ness that in animal husbandry schools a specialty can be identified and course work arranged so that an individual emerges not only as a competent husbandman for swine and beefs, but for laboratory animals. The fact that the job opportunities exist and that this is increasing enough to make it useful for a curriculum committee in a college of agriculture, for example, to spend its time with, is something that is only slowly increasing.

At another level, which Dr. Christensen alluded to, and which is not within our purview here, but I do think reflects a growing awareness, is in the veterinary schools themselves where laboratory animal medicine is increasingly recognized as a professional specialty.

The entry of the programs that have been developed thus far at the junior and senior levels now into the college atmosphere, the mere buildings, the mere image I think would be an important step, and one in which I am in agreement with Dr. Estep. It is something that would bring into play some resources that I don't think we are going to tap just by reworking out what we have done before, and trying to do it in greater depth. We need a new step to implicate a community which is in being, namely, the community college.

Thank you.

DR. CHRISTENSEN: We have heard Dr. Estep, who might be considered a representative of the academic area. I think that most of us who have been concerned in this work have come from the academic area, not all, but most of us, and this has colored our thinking, I am sure. So I would like to ask Mr. Cloyd Elias (S and E Farms), who is a commercial breeder of laboratory animals, how this program we have been talking about would meet his needs.

MR. ELIAS: This takes me rather by surprise. The laboratory animal breeder as a commercial enterprise has had for many years a built-in need for these three categories that have been expressed this morning. To economically stay in business, he has had to employ on the open market labor. There was nowhere to find trained personnel, so he had to actually within his own organization be interested, either in on-the-job training or in addition to that, specified training to meet his needs.

Many times, of course, these are specialized in nature, do not cover all of the various laboratory animals, but they are demanding, and the constant upgrading of the laboratory animal at the research school has compelled him to keep pace with the ever-growing technical knowledge that is required of the personnel who are going to actually physically do this labor.

These programs we feel are providing avenues. They are the start for expanded programs that we could look forward to, as Dr. Christensen said, ten years from now. There is an interim period at this point where existing personnel must be constantly upgraded.

In addition to that there is a constant turnover, and the expanding program makes it necessary to have programs constantly under way, not alone just periodically given once every two or three years, but set programs that are a continuing thing throughout the year.

So I would say that with this in mind, we probably will make many errors when we first start, but somewhere there must be a beginning made, and we in this field feel that this is the ideal approach, and the area which can contribute most to our particular needs.

DR. CHRISTENSEN: Thank you. We have heard from representatives of the academic institutions and the commercial breeders. There is one other group I think we ought to hear from, and I would like to ask Mr. Kenneth E. Kueter (Abbott Laboratories), the most recent recipient of the Ralston-Purina Award, technician's award, to comment on this program.

MR. KUETER: I might say when it comes to surprise, I feel like the other two gentlemen, and I might add, I also feel like Marc Antony when he crawled into Cleopatra's tent and said, "I came here gladly, but not to talk."

I was converted into animal care. I am an ardent convert. I started my career as a frustrated medical student and a very ambitious pharmacologist at Abbott Laboratories 25 years ago. It wasn't until 1950 when I was asked to attend the first Animal Care Panel meeting, which was held at Northwestern University on the campus, and I could see then the handwriting on the wall, because as I believe Mr. Cummings, from Carworth Farms got up and said, "You know, I believe it is harder to get a good animal caretaker than it is to hire a Ph.D." Well, when they went from one extreme to the other in such rapidity, I began to think that perhaps this was a field that needed exploration.

When I went back home and I looked at, if I may use the term, the lousy conditions in which Abbott was testing their million dollar drugs, and I looked at the two dollar dogs that they were doing it with, I began to also realize that a high quality place like Abbott Laboratories, who impose cleanliness on everything else, how could they expect to test these compounds in such dire poverty, biologically speaking.

So by slow evolution, though, management was convinced, and we got better quarters, and naturally as we increased our facilities, and the money began to roll in, and as pharmacological and physiological sciences were advancing, which they are all over, even in the universities, we were able to take care of the recommendations which were, or rather to use the recommendations which were set forth by the Animal Care Panel. We were given opportunities to contribute to this sort of thing, and now I believe that facilities such as caging are very well engineered. I think we have fine cages available, and we are now beginning to look at probably the most important aspect of the thing, and that is the elevation of the lowly animal care-

taker. It does my heart good to finally know, and as a member of the Joe Berg Foundation, and I am dedicated to the advancement of science on the high school level, to feel that there will be an intermediate level between the undergraduate and the elementary, or rather from the elementary school to the graduate school, where a fellow can learn a trade.

Our engineers today are developing perhaps fine buildings and the most modern types of architecture, and I am glad to know now that we can produce carpenters, so to speak, and plumbers, so to speak, in this field of science. I am sure that ten years from now, we will be looking at this thing with much more happiness, and I think it will be a lot more rosy in ten years to come.

DR. CHRISTENSEN: Thank you. Are there any other comments any one would wish to make?

MR. NORMAN BLEICHER (University of California, L.A.): I am sorry Jules Cass is not here, because the program he is trying to develop through the VA in gathering together visual materials is very important for us here, and we are important for him. He is asking, or he is trying to set up within the VA structure a library of visual materials. His main interest right now, I believe, is 35 millimeter or other photographic slides. He asked the work group, and I think I ought to pass it on here, to send to him any materials that you think might be useful in a training program. He will, if you wish, copy the material, and return the original to you, or if you are so generous, send him material that he can keep and save his budget a little. But he has the funds to duplicate it and send the original back to you.

He also asks if you give with each slide some little descriptive blurb so they can be catalogued and cross referenced and can be used by other people intelligently.

He also asks that you give him the freedom to edit your slides, if I can use that term. In other words, if you send him three or four slides, which you normally use as a group, permit him, if he thinks it is important, or his committee does, to take one slide out and put it in a different slot. Eventually they would like to make up little packets of slides so that if you want to give part of your course on parasitology, you can send to him and get a package on external parasites or internal parasites, various slides like that.

DR. CHRISTENSEN: Thank you. We have been informed that the cafeteria would like to see us a little early if possible, so I think we will break the meeting at this point, and reconvene at 1:15 instead of 1:30. Mr. Hill will give you directions.

(Thereupon at 11:45 A.M., a recess was taken until 1:15 P.M., the same day.)

AFTERNOON SESSION

1:15 P. M.

DR. CHRISTENSEN: I would like to call the group to order. This afternoon we are fortunate in having several speakers who have great experience in several areas of interest to anybody concerned with teaching.

The first individual is Mr. Douglas Short, who will speak on Animal Technician Training in Great Britain. Mr. Short has been, I think, the moving spirit behind the Technicians Association in England, and behind their training program. What they have done I think must be largely credited to his efforts. There have been others involved, but he has been sort of the spark plug of the whole effort through the years. At least this is what his colleagues in England tell me. He may deny it.

He is with the Medical Research Council of the National Institute for Medical Research at Mill Hill. He is also an M.B.E., which I understand means Member of the British Empire, and I didn't know that you really had to get something from the Queen to be a Member of the British Empire. I thought all citizens were. Mr. Short.

ANIMAL TECHNICIAN TRAINING IN GREAT BRITAIN

D. J. Short, M.B.E., F.A.T.A.

The number of animals used for experimental purposes has increased at an unprecedented rate over the last few years, and today there is an urgent demand for greater uniformity of laboratory animals and for more expert management. This demand has focused attention on the training and experience of animal technicians.

Before the formation of the Animal Technicians Association in 1950 there was no organized training of animal technicians in Great Britain. Indeed, at that time, the animal technician was often disregarded, and received little encouragement or opportunity to improve his status except by so-called promotion to the laboratory. One of the first acts of the Council of the Animal Technicians Association was to set up an Examination Board to prepare examination syllabuses, organize training courses, and arrange an examination. The first examination was held in 1951 and it was designed for persons who could be expected to handle animals correctly, conduct breeding programs and undertake the day-to-day care of experimental animals. Nine of the 18 candidates were successful at this first Association examination which was an oral and practical one of not less than 30 minutes duration.

There was obviously a need for an examination suitable for the supervisory class of animal technician - the persons capable of taking complete charge of both experimental and breeding animal houses and being responsible for planning work and supervising staff. In 1957, the fellowship examination was introduced to meet this need.

It consisted of a three-hour written paper, in which candidates were required to answer six or seven questions, and a separate oral and practical examination of not less than 30 minutes duration.

At this time, the form of the original Associateship examination was altered to include a three-hour written paper as well as the existing oral and practical examination. It was possible to do this easily because the Council of the Association had retained to itself the right to decide upon the syllabuses and the rules and conditions of examination.

Clearly, neither of the examinations discussed so far was applicable to junior animal technicians of limited experience, so, in 1958, a preliminary examination was introduced for such persons. It provided a qualification for promotion and, thus, an incentive for juniors to remain in animal house work. It is of great importance that junior animal technicians should be given encouragement to persevere in work which is often heavy and tedious. Their faithful performance of inglorious tasks is the sure foundation on which all subsequent experimental work is built. The preliminary examination is open to persons having two years experience in an animal house. The original examination was an oral and practical one of not less than 30 minutes duration, and the period was later extended to not less than 45 minutes. This year, the format of the examination has been altered again to allow for the introduction of a 30-minute written paper of the questionnaire type in addition to the oral and practical examination. The examination covers the general care and maintenance of both breeding and experimental animals and places great emphasis on the skillful handling and sexing of animals. The ability to handle and sex animals without causing them any distress is a prime accomplishment for any animal technician. Consequently, no junior can obtain his preliminary certificate unless he can achieve 75 per cent of the marks allocated for handling and sexing, no matter how good his performance over the rest of the syllabus.

Over the years the standards required by the examiners have risen gently but surely. It should be emphasized that, while the Animal Technicians Association decides the syllabuses and rules and conditions of examination and organizes the examinations, it is the examiners who set the questions and allot the marks. Thus it is the examiners alone who are responsible for the standards of the examinations. It has always been the policy of the Association to employ graduate scientists at the Associateship and Fellowship levels, and Fellows of the Animal Technicians Association as examiners at preliminary level. Help from examiners skilled in the field of animal technology has been freely sought and generously given. In this respect it is appropriate to quote Sir Harold Himsworth, the Secretary of the Medical Research Council, who said "It is in accord with the Medical Research Council's policy to promote the development of skill in the field of animal technology that, wherever possible, members of the Council's own scientific staff are encouraged to share in the teaching of these classes, to examine for the qualifications of the

Association and to assist the Association's work by holding office."

This year the third new set of syllabuses has been published, and from 1965 the examinations will conform to the new pattern. The preliminary examination will consist of a written paper of the questionnaire type, and an oral and practical examination each of not less than 30 minutes duration; the Associateship and Fellowship examinations will consist of a three-hour written paper each and an oral and practical examination of not less than one hour's duration and two hours' duration respectively. A Fellowship of the Association may also be obtained by a thesis or critical review of some aspect of animal technology. The subject of the thesis or review has to be approved by the Association's Examination Board before it can be registered and, on submission of the thesis, the candidate is examined on its contents and related topics.

The first training courses for the Associateship examination were held in 1951 at the National Institute for Medical Research and at the Agriculture Research Council's field station in Berkshire. Both consisted of one-week intensive courses. By 1953 the Chelsea College of Science and Technology, in conjunction with the Animal Technicians Association, was running an evening course. This course originally occupied one year only, but has been extended to a two-year course of 88 hours in all. The same college also offers a two-year course of 120 hours in all for the Fellowship. The Preliminary course occupies one year only and 25 scheduled hours. At the present time there are some 20 centres in England and Scotland running courses of instruction. In urban areas local authorities are very helpful in making classrooms available and paying lecturers' fees, and attendance at the courses is good and lecturers are relatively easy to find.

In rural areas, while there is no lack of enthusiasm, there are many difficulties arising chiefly from the small number of students - many of whom have to travel long distances - and the even smaller number of suitable lecturers. Employers are well aware of these problems and are usually willing to permit students to attend day-release classes or will allow classes to be held on a firm's premises during or immediately following a day's work. Some students have difficulty in gaining experience of a wide variety of animals, but this condition may be remedied if it can be arranged for the students to spend two or three weeks at a large establishment.

It was partly the needs of isolated students, and partly the desirability of getting into print some of the practical aspects of animal technology which caused the Animal Technicians Association to embark upon the writing of its recently published Manual of Laboratory Animal Practice and Techniques.

Since the rules and conditions of examination of the Animal Technicians Association are not applicable in the United States of America, it is necessary to mention only the principles underlying them. No prior educational qualification is necessary before

attempting the preliminary examination, but candidates must have a minimum of two years' experience of work in an animal house. The Associateship examination may be attempted by candidates who have passed the preliminary examination and have a minimum of four years' experience of work in an animal house. The final examination (Fellowship) may be attempted by candidates who have held the Associateship Diploma for at least two years. The time limitation for the preliminary examination, quoted above, is reduced to one year for candidates who hold certificates of education (granted by the Universities of Great Britain and certain other bodies) in English language and a biological subject.

If we accept the use of animals in biological laboratories, then we must also accept our obligations to those animals. They are entitled to humane and considerate treatment at all times, and chief among our cares must be to protect them from any unnecessary discomfort. It is our hope that, by training and qualifying animal technicians, we have contributed not only toward the well-being of laboratory animals but also toward the establishment of standards that are a credit to all who are concerned in biological research.

Thank you.

Appendix I. Examination Questions

Associateship Examination

You have one doe and one buck rabbit. A research worker requires 10 young, weaned, male rabbits, of roughly the same age. Explain why you cannot expect to provide them under, at least, seven months. Mention the different time periods that you would use in this estimation.

In an accident to an animal, a blood vessel is cut. Explain why this vessel is likely to be a vein; why it would be more dangerous if it were an artery; and what difference there would be in the blood held by the vein in comparison with that within an artery.

Three guinea-pigs are to be injected with a bacterium known to be dangerous to man and other animals. They are expected to die in 24 hours. Describe (a) where you would put them after injection, (b) how you would take them to the post-mortem room after death, (c) how you would dispose of their bedding and sterilize the cage after the bodies had been removed.

Describe (a) how infection may spread within an animal house, and (b) the precautions that may be adopted in the daily running of an animal house to reduce the risk of spread of infection.

Describe the best methods of killing mice, guinea-pigs, dogs, and horses. At approximately what ages do the females of these groups of animals cease to be worth keeping for breeding purposes?

Define the terms intravenous, intraperitoneal, pathogenic, inflammation, bronchitis, pseudopregnancy, harem breeding, vertebrae, enteritis, and optimum.

Discuss how you would estimate the number of breeding female hamsters to produce an average of 50 weanlings per week for an indefinite period.

If a research worker requires 20 male guinea-pigs per month for experiments, how big a breeding stock would you need to maintain in order to supply this, and how would you work this out?

State the basic constituents of all animal foodstuffs. Which of these constituents do you consider to be especially important for growing stock?

What do you understand by accessory food factors?

What common laboratory animals require a diet that contains a supplement of ascorbic acid?

What are the advantages and disadvantages of pelleted diets?

How should such diets be stored?

What can cause their deterioration?

Name the infectious disease that you consider to cause the most serious losses in: (a) mice (b) rats (c) rabbits.

Describe how you would recognize any one of these diseases and what steps you would take to control an outbreak in a breeding colony.

What is meant by oral administration? Describe other routes by which a drug may be administered to an animal.

Which vein would you suggest should be used for an intravenous injection to (a) a dog, (b) a rabbit, (c) a rat, (d) a pigeon?

Name the various types of teeth and state their functions. Compare the teeth of rabbit and man. What can go wrong with a rabbit's teeth?

What preparations would you make on hearing at short notice that you were to receive 4 calves?

Describe the structure and function of the respiratory system.

What is the difference in composition of inspired and expired air?

Give an example (a) of a fat soluble vitamin.
(b) of a water soluble vitamin.

Give a list of the foodstuffs in which they may be found.

What vitamin is most unstable?

What are the effects of a deficiency of:

- Vitamin A in a rat?
- Vitamin B1 in a fowl?
- Vitamin C in a guinea-pig?
- Vitamin D in a monkey?
- Vitamin E in a mouse?

Explain why the transportation of monkeys may be described as a complex of predisposing factors.

What common diseases of monkeys are transmissible to man?

What are the four commonest diseases of laboratory mice?

Describe the diagnosis and control of any one of these.

What is the object of maintaining suitable environmental conditions for laboratory animals and how are the conditions assessed?

Discuss: (a) How you would estimate the number of breeding female cats needed to produce an average of 20 weanlings per week for two years?

- (b) Ten beagle puppies are needed weekly for an indefinite period. How many adult female and male breeding stock would be necessary to produce this number? Show how you arrive at this figure.

Discuss the term "euthanasia" and the basic principles involved.

Name the recommended methods for killing:

- | | |
|--------------|-------------|
| (a) Hamsters | (b) Cats |
| (c) Dogs | (d) Ferrets |
| (e) Fish | |

A simple diet is required for the breeding of guinea-pigs. Make a list of the feeding-stuffs you would incorporate in this diet, stating briefly of what nutritional benefit each would be to the animal. List three of the advantages in using cubed diets for the feeding of laboratory animals.

Compare and contrast the sexual cycles of the dog and the baboon.

What simple method is employed to determine the stage of the oestrus cycle in the rat?

How would you care for and feed 50 day-old chicks until they reached the age of six weeks? At that age they are to be caged in pairs for

an experiment lasting a further two months. Sketch a cage (with dimensions) suitable for this purpose and outline a suitable feeding routine.

Write brief notes on any three of the following

- (a) Care of laboratory animals at weekends and over holiday periods.
- (b) The need for greenfood in the diet of rabbits, guinea-pigs, and hamsters.
- (c) Sterilization of cages.
- (d) Signs of ill health in "normal" animals.
- (e) Disposal of bedding from infected animals.

Four white male puppies are to be selected from a litter for an experiment. (a) At what age should these puppies be weaned? (b) Give three methods you could employ for the identification of individual pups, mentioning the advantages and disadvantages of each method. (c) Which Home Office certificate(s) would be required, in addition to a license, if the experiment involved the feeding of a vitamin-deficient diet? (d) What written record of the experiment should be kept to satisfy the requirements of the Home Office?

Describe how you would establish a pure line of mice, mentioning any difficulties which might be encountered.

What are the advantages of breeding guinea-pigs by a harem system in which males are allowed to remain continuously with the females?

What part do the lungs play in the physiology of a mammal?

Describe the mechanism by which the lungs expand and contract.

Give an account of the different types of deterioration that can affect foodstuffs, and the points you would watch in designing and furnishing a food store so that food was preserved in good condition.

Write short notes on three of the following (a) the life cycle of the dog flea, (b) control of an infestation of lice on goats, (c) control of a bug infestation in an animal house, (d) damage that can be done by flour moths and how to avoid it, (e) control of a cockroach infestation in an animal house.

Describe briefly: (a) how to identify individual white mice in a group of 10 that have to be kept together for two weeks, (b) how to feed a pony that is to be kept in a loose-box for a month, (c) how to rear a dozen newly hatched chicks.

Appendix II. Examination Questions

Fellowship Examination

Describe, with diagrams if you wish, the alimentary canal of a rabbit from mouth to anus, and indicate what happens to a normal feed after ingestion.

Compare and contrast reproduction in the guinea-pig and the ferret.

A hospital laboratory requires a new animal house to contain two hundred guinea-pigs for diagnostic tests. Draw a sketch plan of a suitable self-contained unit for this purpose; add measurements and explanatory notes. (N.B. Detailed descriptions of cages and racking are NOT required).

Make a large drawing of the reproductive organs of either the male or the female adult rat. Indicate the name of each part or organ, and mention the function that each performs.

Describe the structures found in the abdomen of the guinea-pig and write one or more sentences about the function of each. Illustrate with the aid of drawings as far as possible.

What are the main functions of a cage for small laboratory animals?

Discuss the factors influencing the choice of material and design for small cages.

What safety precautions would you adopt in an animal house containing animals infected with tuberculosis? Describe the preparation of such animals for post mortem examination, and the conduct of the examination.

What arguments would influence your decision to buy, or to breed yourself, (a) cats (b) guinea-pigs (c) mice?

Describe either a method for the artificial hibernation of frogs or the maintenance of freshwater fish in the laboratory.

Why is it necessary for an animal to digest the food it eats? Describe (a) the changes which proteins and carbohydrates undergo during digestion, and (b) the part played by water and mineral salts in nutrition.

Describe how you would breed to supply a weekly order of one hundred closely-inbred, four-week-old mice of either sex, from a strain that provided one youngster per week for each breeding pair.

Draw labeled sketch plans illustrating the main features of a kennel to house eighty beagles in individual pens each with an outside run.

How would you care for three guinea-pigs inoculated with suspected leptospira-infected material? How would you prepare for a post-mortem examination of one found dead eight days after inoculation? If found positive, how would you dispose of the remaining guinea-pigs, their cage and its contents?

Describe the observations and/or tests you would make on purchased dogs and monkeys before admitting them to your main animal house.

Enumerate the precautions to be taken by personnel engaged in the oral administration of radioactive material to rats.

What do you understand by the terms "secretion" and "excretion"? Describe in detail one of the organs of excretion in the mammal.

Make a detailed drawing of the blood circulatory system in the mammal. Indicate the direction of blood flow, and name the parts of the heart and as many main arteries and veins as you can.

Compare and contrast the habits and life cycles of fleas, lice, mites, and bugs, as ectoparasites of laboratory animals.

What do you understand by the term "prophylaxis"? What measures would you take to maintain a high standard of health in the animal house described in Question B.3?

Question B.3. An experimental animal house comprises six dog kennels, a total of four rooms for rats and mice, one room each for rabbits, guinea-pigs and miscellaneous animals respectively, and outside accommodation for 100 domestic fowl. The technical staff consists of a senior animal technician and three animal technicians. Describe a weekly schedule of work for each member of the staff.

What are lymph glands and what functions do they serve?

How would you deal with soiled equipment and waste material in an animal house containing infections dangerous to animals and man?

How would you measure a piglet's output of urine over 24 hours? Make a drawing of any special equipment needed.

Describe the development from birth to sexual maturity of one of the following species: mouse, rabbit, ferret, sheep.

Give an account of the course and control of a serious virus infection in any species of laboratory animal.

Appendix III. The Syllabus Preliminary Examination

An understanding of the legal requirements covering the management of experimental animals,

e.g., correct labeling of cages
visits of Home Office Inspectors

Handling and sexing of common laboratory animals

Routine care of common species

Methods of feeding and watering to avoid contamination and waste

Recognition of good and bad samples of bedding,
sawdust, peat moss, wood shavings, woodwool, straw,
and hay

Disinfection and sterilization

Importance of routine cleaning and sterilization of cages,
equipment and animal houses

Methods of sterilizing

Use of disinfectants

Personal hygiene

Diets suitable for common laboratory animals

Importance of a dietary source of Vitamin C for guinea-pigs
and monkeys

Elementary knowledge of the components of foods

(protein, carbohydrates, fats, minerals, and accessory
food factors)

Recognition of the signs of deterioration and infestation
in foodstuffs

Control of environmental temperature and humidity

Its importance

Use of maximum-minimum thermometers

Optimum environmental temperatures and humidities for
various species

Recognition of the signs of ill-health in common species

Loss of condition, respiratory infections, infestations

Breeding of common laboratory animals

Lengths of oestrus cycles (seasonal or continuous),
gestation periods, average litter sizes, age and
body weights at weaning and first matings, recog-
nition of good breeding animals

Methods of identification of animals

Humane killing

Use and care of animal and food weighing machines and
balances

Elementary mammalian physiology

Simple arithmetic

Conversions between the metric and British systems of
weights and measures, and between Centigrade and
Fahrenheit scales

75% of the marks allotted to the Handling and Sexing questions must
be attained by each candidate in order to pass the Preliminary
Examination.

Associate Syllabus

Physiology

Mammalian reproduction, including an understanding of the phases of the oestrus cycle and the microscopic appearance of anoestrus, dioestrus, and pro-oestrus and metoestrus

Structure and function of mammalian blood
General outline of the vascular system

Respiration, digestion, excretion

Breeding of laboratory animals and farm animals

Closed colonies, random matings, in-breeding, monogamous pairs, harems, matings at post-partum oestrus, selection of good breeding stock, average weaning and adult body weights, average age and body weight at first mating, duration of economic breeding life

Nutrition

Diets suitable for laboratory and farm animals (including foodstuffs which could be used in an emergency), chemical composition of foodstuffs, constituents of cubed and pelleted diets in general use, functions of protein, carbohydrate, fat, minerals, and accessory food factors, correct storage of food, detection and control of deterioration and infestation in foodstuffs

Hygiene

Handling of infected animals and special precautions for personnel

Disposal of normal and infective bedding and carcasses, recognition and control of common diseases of laboratory animals, prevention of spread of disease, uses and properties of disinfectants and antiseptics, factors governing the choice of method of sterilization, fumigation, and disinfection.

Pests

Identification and simple life cycles of common pests and recognition of their presence: bugs, lice, fleas, beetles, weevils, flour moths, food mites, wild rodents, flies; control of infestations

Management of isolation units for infective animals

Importance of strict discipline and routine, precautions against contamination of persons, other animals and equipment, disposal of infective materials, complete disinfection of isolation units, preparation of infective animals for post-mortem examination, disinfection of post-mortem rooms and equipment

Correct methods of holding animals for injections
 For the withdrawal of body fluids
 Meaning of the terms: subcutaneous, intramuscular,
 intraperitoneal, intravenous, intradermal,
 intrathoracic, intracardiac
 Normal body temperature ranges of various species
 Techniques for taking body temperatures

Elementary knowledge of the care and maintenance of larger animals:
 horses, cows, sheep, goats, pigs, fowls and chicks

Animal house equipment

The use and care of modern animal house equipment,
 racking and cages, weighing machinery, food mixers
 and mincers, watering and feeding equipment,
 animal marking equipment

Animal house management

Prevention of waste
 Daily routine
 Deployment of staff
 General maintenance and repairs
 Sources of supply for animals, foodstuffs and equipment
 Receipt, despatch, transport, import, and export
 of animals
 Isolation and quarantine
 Functions of the Laboratory Animals Centre

Subjects covered by the Preliminary Syllabus, but not specified
 in this syllabus

Fellowship Syllabus

Cruelty to Animals Act, 1876

Objects and scope of the Act, procedure for obtaining
 licenses and certificates and completing forms of
 application, recording of experiments and prepara-
 tion of Annual Returns of Experiments

General anatomy and physiology

A knowledge of the structure and functions of:
 mammalian vascular system
 mammalian digestive system
 mammalian respiratory system
 mammalian urino-genital system
 mammalian nervous system
 mammalian endocrine system
 elementary embryology
 normal post-mortem appearances of common laboratory
 animals

Breeding

Planning and administration of breeding programmes
Record keeping
Elementary genetics

Nutrition

Nutritional requirements of laboratory animals
Nutritive value of common foodstuffs

Disease

A knowledge of the transmissible diseases and infestations of common species; causes, signs, methods of control, elimination including prophylaxis

Germ-free and specific pathogen-free techniques

A sufficient knowledge of microbiology to manage such colonies, elementary microscopy

Radioactive animal experiments (Grade C laboratories only)

Types and hazards of atomic radiations
Monitoring methods
Relative toxicity and permissible levels of commonly used isotopes
Dose units and maximum permissible radiation levels
Handling, caging, and maintenance of radioactive animals
Decontamination of cages, equipment, and personnel
Disposal of radioactive cadavers and materials
The principal requirements of the Radioactive Substance Act, 1960

General knowledge of birds, reptiles, fish, and amphibia

Maintenance of frogs, toads, and fish

Animal house design

Structure and choice of materials
Layout of rooms
Ventilation and control of temperature and humidity
Heating, lighting, and insulation
Supply of services
Animal houses for special purposes e.g., radioactive, S.P.F.

Animal house equipment

Merits and limitations of conventional and modern materials for cages and equipment
Labor-saving devices

Administration

Bookkeeping for staff, animals, equipment, and food
Simple costing
Management of staff

Subjects covered by the Preliminary and Associateship syllabuses but not specified in this syllabus.

....

While the use of animals in the laboratory leads to discoveries which are possible by no other means, and gives results of great value about human and animal welfare, if we claim the assurance that the end justifies the means, we must not do so without the reservation that every aspect of animal handling must be conducted under humane conditions and standards. We hope by this system of formal training and qualification that we have contributed towards establishing and maintaining standards which are a credit to all engaged in medical and biological research, and standards which we hope in the future may not only become national, but international. Thank you, Mr. Chairman.

(Applause)

DR. CHRISTENSEN: We have a little bit of spare time. Are there any questions anyone would like to put to Mr. Short?

DR. HENRY SCHNEIDER: My question is a very short one. What is an approved laboratory?

MR. SHORT: This is difficult to define, and it is approved by the Council of the ATA, but it would be any laboratory run by bodies such as universities, a research establishment, commercial establishment. We put that in since there are one or two pseudo-medical faculties producing probably some queer pills and potions people in Great Britain might like to take that we think are not approved. We put that in -- it is not for any ulterior motive, but just to protect ourselves, because we get applications from everybody. We get them from greyhound associations where they want their technician looking after greyhounds trained, so we give ourselves recognition. We have never, I don't think, ever turned anybody down yet, but we thought we would put this in as a safeguard.

DR. CHRISTENSEN: Are there other questions?

Dr. Bingham asks Mr. Short to comment on having a few lecturers as opposed to a number of lecturers in the preliminary course.

MR. SHORT: In the preliminary courses, we get probably one person to do three lectures. I don't think it is a good thing for one person to do too many lectures, because they get used to the monotonous tone of your voice, and you don't bring a fresh approach to this. I think the more lecturers you can get, the better it will be, even if some of them are pretty bad. At least they are different, and you get a different point of view. I know that if I start to give too many lectures to our preliminary people, I think I am very, very good, but I can see by looking at the back of the class that some of these people don't think I am half so good as that, and you

can see them nodding off, and this kind of thing. Also, it is nice to get somebody other than the supervisor, I think, to talk to the people that you work with all the day long. I think this fresh approach is a great thing.

May I take this opportunity to thank Dr. Christensen and Mr. Hill for inviting me to this gathering. I feel very honored, and rather humble. When Dr. Christensen says I have been the leading light, you know, as well as I do, that any group of people who get together to do something, everybody has a contribution to make, and there are many colleagues of mine in Great Britain who have done just as much as I have to forward this concept. I admit we are a dedicated group. You have got to be if you want to get anything done in our country. Thank you.

DR. CHRISTENSEN: Are there other questions? Thank you, Mr. Short.

Of course, one of the problems that we deal with in any kind of program such as we are considering is the problem of adult education, because in many ways this is adult education. We don't start our people quite as young as they do in England. I was somewhat appalled when I first went over there and saw these pretty young 15 year old girls doing heavy work that we ordinarily consider only men should do over here. I must say they were attractive and livened the place up a little, but they do start younger than we do.

We are fortunate in having Dr. Earl M. Bowler, whose title is Chief of the Professional Services Section, Manpower Development and Training Program, Office of Education, who will speak on adult education methods. Mr. Bowler.

ADULT EDUCATION METHODS IN TEACHING ANIMAL TECHNICIANS

Earl M. Bowler

The Division of Vocational and Technical Education of the United States Office of Education became interested in the training of animal technicians when the Department of Veterinary Medicine of one of the major southern universities contacted us. They proposed a pilot project in training that would fulfill some basic needs in two ways: one, provide research programs with qualified personnel in the supporting laboratory animal colonies and, two, provide specialized training for unskilled persons in the lower groups. My remarks today will center around the areas of discussion we had with men in charge of the university laboratory and training program.

Our interest in the training and retraining of the unemployed let us to inquire into the magnitude of the job to be done. We were concerned with the questions: Is this something that one institution is interested in or is it something that many institutions are interested in? Is this an area of work in which there are a great number of people employed?

We prepared a simple survey or census form and mailed it to half a dozen sources to sample the climate. This brought us into contact with some of you who are here. Fortunately for us, it put us in contact with Berton Hill, your executive secretary. Information we now have suggests that we should try to be of help to this group.

Two pieces of recent legislation should have great impact on training. These are the Vocational Education Act of 1963 and the Manpower Development and Training Act of 1962. In addition, for many years, there have been programs of training for youth and adults in vocational education and vocational technical education.

During fiscal 1965 there will be available under the Vocational Education Act of 1963, \$118 million of new federal money apportioned to the states as grants-in-aid for preparatory and extension programs of vocational and technical education. The federal money will need to be matched dollar for dollar with state and local tax moneys or with local tax money, but it is a dollar-for-dollar matching arrangement.

Vocational education, for a number of years, has had grant-in-aid programs. The Smith-Hughes Act has been on the books since 1917 and the George-Barden Act since 1956. Approximately \$58 million of federal money has been available for matching by state and local governments. Prior to the passage of the Vocational Education Act of 1963, the states were matching federal dollars with about four or five state dollars to one dollar of federal money. You can see the importance of the Vocational Act of 1963 in bringing into better balance this arrangement of dollar-for-dollar matching.

Specifically, federal funds may be used for vocational and technical training in any occupational field that reflects conditions in the changing world of work. In addition, the new act provides for the construction of area vocational-technical schools. It authorizes allowances for pupils who need money to remain in school. This is defined as a work-study program. Individuals who are deserving and can qualify may be put to work on projects in school or in local, state, or county governmental agencies. The act also provides for the support of teacher-training and curriculum-development programs, and it encourages research to discover the best methods of solving the problems of the economically, culturally, and academically handicapped.

Under the Vocational Act of 1963 the Commissioner of Education is empowered to retain 10 per cent of the funds to make grants for research. In fiscal 1965, which began on July 1, 1964, the Commissioner will have \$11.8 million to spend for research. In 1967 this amount should increase to over \$22 million.

Vocational educators conducting training will focus attention on training for the academically handicapped, the socially and economically deprived, the technologically displaced, and slow learners. Training will range from this as a floor to a ceiling of training

for the technically talented in the more sophisticated areas of technology.

People of all ages in all communities of a state are to be served by the schools benefiting from the federal funds under these acts. Included will be high school youth, drop-outs, and those with economic or academic problems. Adults, and those who have completed high school are to be trained. Unemployed or displaced persons needing retraining, and individuals needing refresher courses are to be upgraded to keep pace with the changing nature of their work in business, industry, or agriculture. Training may be offered at almost any grade level and for jobs of varying degrees of learning difficulty. The funding, however, is not aimed at subsidizing programs for individuals who are working toward baccalaureate degrees.

In addition to the Vocational Education Act of 1963, I mentioned the Manpower Development and Training Act. During fiscal 1965, approximately \$307 million has been appropriated by Congress for this program. A portion of the \$307 million will be used for what is known as institutional training. Individuals in training who are or have been heads of households may receive subsistence allowances while in training, so a portion of the \$307 million will be spent for this activity and a portion of it for institutional training.

Under the Manpower Development and Training Act, programs do not extend beyond 52 weeks; many are considerably shorter. Under the Vocational Education Act of 1963, programs are approximately two years in length. The latter fit nicely into the typical post-high school or two-year community college or technical education programs.

Recently, the Manpower Development Act was amended to provide an additional 20 weeks of training. This change makes possible basic literacy education to be given those who lack skills in reading, writing, and other fundamentals. It is intended that the 20 weeks of additional training would not be given as a separate course, but would be a part of the educational development of the individual and be given along with the skill development.

A group such as the Animal Care Panel or your parent organization could assist in sponsoring training under the Manpower Act. Programs operated under the two acts, together with vocational education in the regular program, are under the direction of State Boards for Vocational Education. There is a State Board of Vocational Education in each of the 50 states. This board has the final authority, in all matters pertaining to vocational education, and the board usually designates a State Director of Vocational Education as its representative to administer programs under the act.

Most states have supervisors in such areas as technical education, agricultural education, and trade and industrial education. Those of you who are interested in training technicians will find the state supervisor a good source of information and help in matters

pertaining to technician training. Each of these state supervisors could assist you with information about the training resources available within the state. Your statewide committee or local group should explore with the state vocational education supervisor the resources available to your group.

We in vocational and in technical education are strong believers in advisory committees. Most states have several advisory groups. Many local schools have advisory committees in the key occupational areas. I assume that many of you work cooperatively as members of such committees advising vocational educators.

A local manpower-development program may be initiated through the efforts of a local manpower-advisory group. Surveys are made by the public employment service prior to funding. If job opportunities exist in your laboratory, the public schools are interested in manpower programs that meet this need. The employment service interviews, screens, and counsels prospective trainees, and when the training is completed, they place those trained in the program.

The Division of Vocational and Technical Education has regular channels of communication to State Boards of Vocational Education in the 50 states. We are prepared, at the national level, to relay to state vocational educators information about associations willing to work out cooperative relationships at the state or local level. The directors of vocational programs in local communities can assist groups such as yours in establishing preparatory programs or upgrading programs as needs dictate. Your representatives should make their wants and interests known to school administrators.

Experience in working with adults in vocational-technical fields tends to favor short intensive-type courses. If I may take a homely illustration, courses should be packaged as weiners rather than as a sausage. Adults usually are more interested in completing several short courses for which they receive tangible recognition than they are in laboring for a long span of time to accomplish something which may seem insurmountable.

We are finding that literacy training for adults is becoming increasingly important, especially when working among the unemployed. Sizable sums of money will be spent this year in the preparation of instructional materials to be used by teachers working with adults.

As has been pointed out to you, tests that determine comprehension, attitudes, aptitudes, interests, and dexterity are becoming recognized tools that help to speed up adult learning. They shorten the processes of determining what individuals need.

Corrective measures to overcome loss of sight, hearing, and other faculties in adults are becoming more and more commonplace. We are recognizing that if we are to reach adults and salvage them, corrective measures must come before training.

Subsistence allowances made available to adults while in training tend to relieve anxiety and to make possible more thoroughness and orderliness in the training situation.

In dealing with adults, we find that the orderliness of the school and of the procedures involved, the organized plans of the teacher, and the arrangement of shop or laboratory tend to affect adult learning favorably.

Group interaction is important and should be used to a greater degree. Role playing, brainstorming, ideation, and similar techniques tend to hold the interest of adults and are favored in vocational training. The opportunity to talk things over or to talk them out is important to adults as well as to younger people.

We know that adults want to participate and that they are much more interested when group interaction is possible. Instructors must be capable of providing a climate in which participation is possible. The individual must feel secure, or feel no sense of anxiety, if he does participate. This leads us to the fact that instructors working with adults ought to be skilled conference or discussion leaders. They should be capable of drawing out and capitalizing on the experiences of adults.

In vocational education we say that the strongest method we possess is "demonstration." In this situation we use actual tools, materials, and equipment. We say: If you can't demonstrate, illustrate. Visual materials should play an increasing role in adult education. Because past educational experiences may not have been pleasant, new adult enrollees should be made to feel that they are being oriented to new learning situations.

How do we accomplish this? We could start with the elimination of tablet armchairs. The association here may be extremely bad for some adults. Men and women who are large are embarrassed to attempt to get into a tablet-armchair gracefully. Many drop out of school a second time rather than struggle with this problem. The use of tables and chairs is recommended. Individuals should be seated so that they can see each other's faces and get the reaction of other individuals as they work.

Vocational and technical educators recognize the importance of individuals manipulating things while learning. Manipulation should start very early in the training program. Adults should sense that this learning situation is different from the one from which they have come.

Visualization should replace much abstract learning. Group-centered motivation tends to heighten interest. Ideas and suggestions should grow out of the group.

Vocational educators have access to teacher-education programs in the major universities in the states. Instructors may need help

in teaching techniques, in preparation of instruction materials, in methodology, and in the development of visual materials. These and other services are available through vocational teacher-training institutions in the states.

Well-prepared teachers skilled in working with adults can assist in carrying forward adult training programs for this and other groups at the local level or state level in many locations throughout the nation.

You have been a most patient audience. I have enjoyed speaking to the group. If there is time for questions, I should be happy to try to answer them.

(Applause)

DR. CHRISTENSEN: Thank you, Dr. Bowler. Are there any questions for Dr. Bowler?

There may be some general comments later.

Our final speaker, Dr. Norman Hayes, of the Communicable Disease Center of the U.S. Public Health Service, Atlanta, Georgia, will speak on teaching aids for laboratory animal training programs. I think most of you are familiar with the fact that CDC has done a great deal in the way of teaching aids for laboratory personnel of one kind or another. Dr. Hayes.

TEACHING AIDS FOR LABORATORY ANIMAL TRAINING PROGRAMS

Dr. Norman Hayes

Teaching aids for laboratory animal training programs could be expanded to mean almost any conceivable teaching-learning process. We realize that teaching aids we mention are not the only devices that can be effectively employed nor will they in all instances be your preference. Of major importance is that teaching aids require a transfer of learning. Consequently, they should be convincing, of suitable size, simple, and easy to use.

We feel that specific consideration has to be given to determining:

1. employee needs
2. program needs
3. organization needs.

In determining employee needs, we refer to projecting individually the goals you would have the employee reach, then going back step by step outlining methods or steps through which these goals may be reached.

These goals should not be too generous or too rigid. Also

you must consider physical handicaps, limitations of mental ability, and anything that might hinder work performance.

In determining program needs, we have reference to unit demands. What is the purpose of the job? What is required of the animal technician? How can these demands be met?

Determining organizational needs explains the whys. What is the organization doing and why? Why should the best care possible be given for animals? Why neglect of duty may lead to extreme losses of time and money.

Before these determinations are made, we must all agree that well-organized instruction and training are needed. It has been only within the past few years that any nationwide organized interest in training in this area has been manifested. Prior to that time this training was left to the laboratory director.

Then we get to the question of what training methods and aids are available. It is not likely that we can vary much from teaching aids in general. This means we are going to utilize as many of the five senses as possible in the teaching-learning process.

Selection of the best teaching aids cannot be covered in a simple statement. It depends entirely on the nature of particular subjects. I was involved in teaching the laboratory animal section in three different programs at the Communicable Disease Center during the past year. I would like to tell about a few of the training aids used in these programs.

The first program was given over to the animal technicians, and in its presentation we followed the animal technician training course outlined by the Animal Care Panel. The film "Animals in Medical Research," available through the Veterans Administration, was used to further emphasize "Introduction to Animal Care." We plan to teach the same course in April of this coming year, and this time we hope to incorporate the film, "The Laboratory Animal Technician, a Career in Care."

"Life, Living Matter, and Biological Organization" was supplemented with the film, "World of Microbes," available through McGraw-Hill.

We were not fortunate in finding ready-made aids to illustrate structure and function of laboratory animals, so we utilized our own. A few of these I have with me.

This is one that we used when we were studying the skeletal system, and it was very helpful. You can leave this chart right at the laboratory, so that the technician in his spare time can come back and review the major skeleton of the rabbit.

In studying the reproduction of the female -- this one,

incidentally, is the rat -- we had this chart drawn, and it was very helpful.

This is a drawing of the male reproductive system.

All I am trying to say is that if you don't have the training aids readily available, you will probably find someone close by that you can call upon to help you make suitable ones. I think you will find them very helpful.

Also to help supplement the sections in our training on the handling of laboratory animals, I have some slides that were used during that time.

May I have the first slide?

This is the way we receive our monkeys, but this tells us something. We can use this to help illustrate shipping and receiving of that animal. So if you use the resources at hand, you discover teaching aids that are very valuable.

(The speaker presented two charts and numerous slides to illustrate various teaching situations including the skeleton of a rabbit, the male reproductive system, shipping crates and containers, methods of restraint, techniques for tuberculin testings and obtaining rectal swabs for bacteriological examination, inoculation methods, bleeding procedures, etc.)

We have still another training aid that looks to be very promising for the future. It is called the single concept film.

What we have here is an eight-millimeter film. In the very near future we can film the different animal techniques, and place the film in the room with the animal caretaker, or on the bench. This eliminates the classroom type instruction. You can't even put the film in the machine wrong. You push it in, until it clicks, and turn it on.

The idea is to eliminate the classroom-type instruction. The caretaker can follow along with the picture, doing his work with the same techniques described on the screen. You let the film run and it repeats itself over and over.

I want to apologize here, because I don't have a film on animal technique, but we will have soon. I just show this film to demonstrate the concept.

(Demonstration of teaching aid.)

We must admit that teaching aids for laboratory animal training programs are not well organized, but I gather from the previous lectures this morning that they soon will be. We must stay abreast of developments and integrate them into our programs.

We would like to thank the Visual Aids Committee of the Animal Care Panel for the excellent job they have done in compiling the list of films and film-strips related to animal care.

(Applause)

DR. CHRISTENSEN: Are there any questions for Dr. Hayes?

DR. BLEICHER: What is the name of that, or who makes it?

DR. HAYES: This is called the Mark IV, and it is made by Fairchild.

DR. CHRISTENSEN: It is the Mark IV Fairchild projector.

DR. BLEICHER: Could we make our own films and buy those cartridges to put them in?

DR. HAYES: Sure. You may have to send off your film to have the cartridges fixed. I am not sure.

DR. CHRISTENSEN: Are there any other questions?

Well, I am happy to say we are well ahead of time. This usually does not happen. It may happen this time, because usually at the other meetings I am not Chairman, and I talk too much.

I now have the task of summarizing what has gone on here. The task is unenviable, as you may realize. I think we can break it down into a few categories.

First, considering the activities of the various study groups, they have, I think, reaffirmed in general the philosophy that has guided us from the beginning, which is satisfying to those of us who have been in the business for some time. Our approach has been sound apparently. They have reaffirmed in general the soundness of the junior-senior curricula, which we have been using in the past. They did change everything but Item 10, but nevertheless the content remained about the same.

One of the things which has been most gratifying to me is the action of Study Group II, which was concerned with this top man, a matter which we have not had much time to consider in the past. They have given us some new thoughts; those of us who have been in the business I am sure have gotten some new ideas from their recommendations, and I think one of the most important things they have done is to think of a mechanism for transferring from our interim period in which we are now to what we hope will be the pattern in the future. I don't think any of us have given too much serious thought to this. They did, and I think they have a plan or recommendation which has a great deal of merit to it. While it is perhaps a minor point, I am awfully glad that they have finally come up with some term other than "supervisor", with all of the semantic difficulty that has been

given those of us in this field in the last eight or nine years. It has been a terrible problem.

Of our speakers, I think we have been extremely fortunate in having Mr. Short, who has given us the advantage not only in the study groups, but in the lecture you just heard, of his guidance and example of a working precedent to the kind of thing we are trying to do. We are not going into this blindly. We have a precedent which we know works, and which has been very successful. As I say, we have been fortunate in having one of the outstanding people concerned with that project here to help us. We have taken, I think, a great deal from him in the way of ideas and plans, and will undoubtedly use them.

Dr. Bowler started with the best introduction that any speaker can have. He hinted that there was money available. There is no better introduction for a speaker. But in addition to that, and particularly of interest I think to those of us who have been actively engaged in these programs, he has given us some new thoughts on adult education, on techniques, on some of the problems, on some of the motivations that these people have, which I don't think have occurred to many of us. For example, it never would have occurred to me that the traditional scholastic tablet-armchair would have any disadvantage. Once it is mentioned, I can see that. He mentioned a number of other points which I think all of us concerned with adult teaching are going to remember. At least I hope we do.

Dr. Hayes has shown us how in a very exact way teaching aids can be integrated into these programs. We have talked about teaching aids. We had one study group working on teaching aids. But I think it is still valuable to see how these can be used and see what can be made available. I know, too, from some of the activities of CDC that he touched only on a fraction of the things they have done and plan to do. They have really, I think, a rather unusual and extremely valuable program in the way of teaching aids in the CDC.

So I think to summarize it very briefly, and to come back to the remark I made at the opening of this meeting, I think we now have a working definition of a new technical discipline, the animal technician. We pretty well understand what we are talking about. It is a discipline and we have a definition which we can give to other people.

I think we have a working blueprint of what to do and how to do it to obtain this objective of a new technical discipline. I think equally important and something that is frequently not done in groups of this kind, we have given some thought to the future development of this program, and mechanism for the necessary transition to this future program. I think that, as far as I am concerned, summarizes precisely what we have done today.

I want to thank all of you for attending, and most particularly thank the members of the workshop groups who labored long and hard, and I think did an excellent job. Thank you all.

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Appendix IV.JUNIOR-SENIOR ANIMAL TECHNICIAN TRAINING COURSE OUTLINE

Key: J-Junior; S-Senior;
 () - level at which training
 emphasis placed.

J/S - emphasis the same in class
 time but different in content.

1. Introduction to Animal Care
 - A. Why use animals - J
 - B. History and scope of experimental animal use - (J)S
 - C. Taxonomic relationships of animals and man (evolution) - J/S
 - D. Choice of animals for experimental use - J(S)
 - E. Relation of the technician, the investigator, and the animal (J)S
 - F. Animal care as a career - J
 - G. Laws relating to laboratory animals - J(S)
 - H. Basic scientific terminology and measurements - J/S

2. Life, Living Matter, and Biological Organization
 - A. Living and non-living matter - J/S
 - B. Cells, tissues, organs, organ systems, and the organism - (J)S
 - C. The animal and its environment - J/S (J-physical; S-biological)

3. Structure and Function
 - A. Skeleton, muscles, and skin - (J)S
 - B. Circulatory and respiratory systems - J/S
 - C. Digestive and excretory systems - J/S
 - D. Nervous system and sense organs - J/S
 - E. Endocrine systems - J/S
 - F. Reproductive systems - J/S

4. Genetics and Mating Systems
 - A. Inheritance of biological characteristics - (J)S
 1. Review of cellular structure - S
 2. Cell division - S
 3. Units of heredity and Mendel's Law
 - B. Mating systems - J(S)
 1. Randombred, inbred, and hybrid systems
 2. Recordkeeping
 - C. Practical breeding considerations - J(S)

5. Nutrition and Metabolism
 - A. Nutrition and Metabolism - J/S
 1. Proteins, fats, carbohydrates, minerals, vitamins, water

- B. Energy requirements and metabolic pathways - J(S)
 - C. Practical feeding considerations - (J)S
6. Handling
- A. General considerations - (J)S
 - B. Animal restraint - (J)S
 - C. Operative manipulations- J(S)
 - D. Individual and group identification - J/S
 - E. Anesthesia - J(S)
 - F. Euthanasia - J(S)
 - G. Disposition of animals - J/S
7. Animal Health and Disease
- A. Spectrum of health and disease - J/S
 - B. Non-infectious disease - J/S
 - 1. Nutritional disease
 - 2. Degenerative disease
 - 3. Hereditary and developmental disease
 - 4. Injuries
 - 5. Tumors
 - C. Infectious disease - J/S
 - 1. Host-parasite relationships
 - 2. Common laboratory animal diseases
 - 3. Disease as a population problem
 - 4. Prevention and control
 - D. Gnotobiosis - J(S)
8. Sanitation and Hygiene
- A. Basic principles of sanitization and sterilization - J/S
 - 1. Physical
 - 2. Chemical
 - 3. Thermal
 - B. Practical sanitization and sterilization procedures - (J)S
 - C. Pest control
 - D. Animal and waste disposal - J/S
 - E. Personal hygiene - J/S
9. Housing and Equipment Design
- A. Basic cage types and accessories (J)S
 - B. Ancillary service equipment - J(S)
 - C. Building and fixed equipment - J(S)
 - 1. Traffic patterns
 - 2. Materials
 - 3. Environmental control
 - 4. Basic building design
 - D. Optimal environmental requirements - J/S
10. Administration, Management, and Recordkeeping - all - J(S)
- A. Personnel management
 - B. Work schedules
 - C. Procurement and distribution of animals and supplies
 - D. Animal, equipment, and supply records

11. Shipping and Receiving Animals
 - A. Rules, procedures, and practices of transportation agencies - J(S)
 - B. Selection of animals, container, and carrier - J(S)
 - C. Preparation of animals for shipment - J/S
 - D. Transportation of animals - J/S
 - E. Reception and quarantining of animals - J(S)

12. Safety
 - A. General institutional safety rules - (J)S
 - B. Animal house safety - J/S
 1. Personnel protection
 2. Animal protection
 3. Property protection
 - C. Special situations - J(S)
 1. Radioactive
 2. Infectious materials
 3. Physical and chemical agents

13. Animal Experimentation
 - A. Experimental design - J(S)
 - B. Role of the technician on the research team - J/S
 1. Responsibility for proper animal care
 2. Comprehension of research goals
 3. Recognition and reporting of variables

LABORATORY ANIMALS

- Part I. Guide for the Shipment of Small Laboratory Animals (Publications 846). \$1.50
Information on preparing research animals for shipment, care of experimental animals while in transit and proper procedures for the introduction of research animals into the scientific laboratory.
- Part II. Animals for Research (Publication 1199). \$2.00
A directory of sources of laboratory animals, both domestic and those obtained from the wild, together with sources for equipment and materials required in the maintenance of experimental animals.
- Part III. Recommended Minimum Standards for the Shipment of Laboratory Primates (Publication 971). \$1.50
Enumerates in detail procedures for the shipment of primates within the country of origin, from the country of origin to the country of destination, and within the country of destination as well as pertinent import regulations of the U. S. Government.
- Part IV. Graduate Education in Laboratory Animal Medicine (Publication 1284). \$1.25
Reports on workshops on the definition and parameters of laboratory animal medicine, an analysis of the present and projected manpower needs, and appropriate graduate training in laboratory animal medicine.